Remaking the Mazeway:

Skeletal and archaeological evidence for a variant Ancestral Pueblo mortuary rite at Wallace Ruin (USA)

Volume 1 of 2

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I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: …………………………………………………………..

To my parents, whose support and encouragement made my dreams and my own "house society" possible.

Weldon and Lita Smith

Thanks for the memories.

ABSTRACT

This thesis presents the results of a multi-disciplinary investigation of a variant Ancestral Pueblo mortuary rite at Wallace Ruin, southwest Colorado (USA). This multi-storey building is one of four Lakeview Group great houses connected to the Pueblo II regional system centred at Pueblo Bonito of Chaco Canyon some 100 km to the south. From c. AD 1060-1150, Wallace Ruin functioned as a ritual-economic centre with a small residential component. Then, habitation of this great house, the Lakeview Group and all domiciles within 10 kilometres ceased. However, three or more decades later at least six rooms were used as a non-residential, Pueblo III mortuary facility for a minimum of 32 individuals. This utilisation was in marked contrast to the enduring Ancestral Pueblo practice of residential burial, usually in the extramural midden. The interrogation of several hypotheses regarding this anomaly entails a bioarchaeological approach that integrates skeletal evidence with spatial analyses regarding diachronic mortuary location choices at Wallace Ruin. Taphonomic methods that segregate bone displacements during corpse decomposition in a filled versus a void space provide accurate determinations of the depositional versus discovered mortuary microenvironments. The diachronic analysis of data from roughly 200 San Juan Region sites reveals additional ways in which Wallace's Pueblo III mortuary program departs from longstanding communities of practice, whether great house or domicile. Chief among these are the use of a surface room floor and the postural arrangement of supine bodies with knees upright. These results, in combination with material culture evidence, form the basis of this thesis: *The Pueblo III mortuary program at Wallace Ruin is a variant rite that entails a Mesa Verde Region reformulation of a Pueblo Bonito house society.* The sanctioned retrieval of objects of memory offers a plausible explanation for intentional intrusions into two mortuary contexts. Beyond addressing questions concerning Wallace Ruin, a major contribution of this study includes advancement of the house society model as an interpretive scheme for evaluating Mesa Verde Region socio-ritual dynamics. This research also demonstrates the effectiveness of *anthropologie de terrain* (Duday, 2006) to retrospectively determine the original status of Ancestral Pueblo mortuary microenvironments. The refinement developed for this study, in which Range of Motion criteria are used to detect large-scale movements of lower limbs during corpse decomposition, is suitable for bioarchaeological analyses the world over.

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LIST OF ABBREVIATIONS

A	Adult
AMB	Ambiguous
AO	Adolescent
AZW	Aztec Ruin, West
Block	roomblock
C	Child
CCL	Chaco Canyon Locality
ExRms	excavated rooms
EXT/S	Extended/supine
F	Female
FLX/L	Flexed/Lateral
I	Infant
iLink	Individual Link
IJP	Ida Jean Pueblo
ISE	isolated skeletal element
LVG	Lakeview Group
LVL	Lakeview Locality
M	Male
M41	Morris 41
MA	Middle Adult
MCT	Mortuary Context Type
MSJR	Middle San Juan Region
MTD	Mortuary Trends Database
MVNP	Mesa Verde National Park
MVR	Mesa Verde Region
NSJR	Northern San Juan Region
OA	Old Adult
PA (MS)	Pueblo A, Mitchell Springs
PB	Pueblo Bonito
PBC	Pueblo Bonito Clusters
PBD	primary burial deposit
PBN	Pueblo Bonito, North Cluster
PBW	Pueblo Bonito, West Cluster
Rms	surface rooms
ROM	Range of Motion
SJR	San Juan Region
SR	Salmon Ruin
SSJR	Southern San Juan Region
USF/S	upright semi-flexed/ supine
WR	Wallace Ruin
YA	Young Adult
YJH	Yellow Jacket Hamlet
U	unknown/indeterminate

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PART A

THEORETICAL AND HISTORIOGRAPHICAL CONTEXT

CHAPTER 1

INTRODUCTION: THE MAZEWAY

1.1 The Archaeological Problem

As interpreted by van Gennep (1960:105-106) in his milestone study *The Rites of Passage*, the purpose of rites of separation in death rituals is to sever the living from the dead. As will be demonstrated in this study, the Pueblo III mortuary use of Wallace Ruin turns this concept on its head. In marked divergence from the ubiquitous and longstanding Ancestral Pueblo practice of residential burial, the dead were transported many kilometres for deposition within this long-abandoned, Chacoan great house situated in Mesa Verde Region (MVR) of the southwest US. Even then, buriers could have followed the most common MVR practice and interred these corpses within the extramural midden, or even in Pueblo II cultural refuse deposits that filled rooms of Old Wallace, the founding multi-storey great house subsequently incorporated within the current building. Alternatively, buriers could have deposited most of these remains in subfloor pits, rather than just the three discovered to date. Instead, they chose to deposit multiple enwrapped corpses on the floors of empty rooms, in a series of deposition episodes. These events afforded opportunities to view the dead as well as interact with these accessible mortuary contexts in commemorative rituals. In addition, some mortuary deposits would have been even more obvious since several bodies, at least, were positioned on the back with semi-flexed (crouched) lower limbs arranged with knees upright, rather than deposited on the side in the more common configuration. Finally, three intrusions into the great house disturbed of numerous primary burial deposits which include the removal of bones from the mortuary context, the re-deposit of disordered bones within the mortuary context, and the removal of bones to other rooms for re-deposit that, in one case, involved a structured deposition.

This combination of circumstances begs several questions. Foremost, what may have prompted them to abrogate ancient practice and bury the dead so far from home? How distant were residential communities to Wallace at this point? How common was the use of rooms as sepulchres? Are there other sites in which floors were used as a locus for primary burial deposits? Given the utilisation of Wallace's fully accessible chambers, are there parallels to the numerous commemorative actions described in Williams' (2003) *Archaeologies of Remembrance: Death and Memory in Past Societies,* an edited volume that focuses upon archaeological evidence for strategies of remembrance from Neolithic times to the present day. Of prime interest are the potential for the manipulation of bodies, the subsequent deposit of items in the mortuary context, and feasting within the immediate vicinity of the dead. How common is the upright knees postural arrangement? Is there a difference between great houses and residential sites in this respect? Is there a plausible explanation that encompasses the full range of the mortuary variability observed at Wallace? Finally, do these intrusive episodes point to a subvariant mortuary behaviour involving the intent to interact with the dead? In other words, do these represent a secondary burial treatment related to the decision to use the great house as a mortuary facility or other processes? Some of these questions have been raised by other scholars, either directly or indirectly. Others are generated by evidence observed during this researcher's years of work at Wallace Ruin and on other projects involving Ancestral Pueblo sites. These and other questions are evaluated through the testing of the four hypotheses identified below.

The Pueblo II (c. AD 900-1150) and Pueblo III (c. AD 1150-1300) details that are pertinent to this thesis are addressed in Chapter 3. However, for the purpose of clarity it is noted here that these bracketing dates are approximate and primarily entail the decline or absence of dendrochronological evidence for building construction across settlements and large territories. In other words, these dates represent actions that occur *by* rather than *at* either approximated threshold.

1.2 Explanations of Mortuary Variation at Wallace Ruin: Hypotheses

1.2.1 CHACOAN REVIVAL HYPOTHESIS

The Chacoan Revival Hypothesis is advanced by Bruce Bradley (1996; 2004), the principal investigator of Wallace Ruin (hereafter referred to as B. Bradley; this author is designated as C. Bradley). He proposes that the Pueblo III use of this isolated and long-abandoned great house for mortuary and religious purposes represents a renewed emphasis on Pueblo II Chaco Phenomenon metaphors in the Northern San Juan Region. He also posits that this pan-regional religious movement also included the Pueblo III mortuary use of the satellite great houses of Aztec Ruin and Salmon Ruin. In Bradley's view, this reaction developed in response to the introduction of a competing cosmological perspective after AD 1240. In such case, floor deposition within the abandoned Chacoan great house represents a variant mortuary practice that correlates with Chaco-inspired architectural emphases occurring in some Late Pueblo III communities in the Mesa Verde Region, perhaps most obviously at Sand Canyon Pueblo. This aggregated village, with a D-shaped layout, is located some 24 km west of Wallace Ruin. In this hypothesis, religious ideas are construed as a structuring principle during times of social and ecological upheaval. Interrogation of this proposition involves the assessment of mortuary evidence from Chaco Canyon great houses and Chacoan great house sites located beyond its confines, or Chaco outliers. Falsification rests upon evidence for the Pueblo III mortuary use of Wallace and other Chaco outliers prior to AD 1250.

1.2.2 SOCIO-NATURAL HYPOTHESIS

In the Socio-natural hypothesis, the Pueblo III use of Wallace Ruin involves the attempt to establish rights to the fertile croplands that surround the great house. It draws upon ideas advanced by two independent proposals, though both are underpinned by economic considerations. As postulated by Mahoney and colleagues (2000:84), Pueblo III villages may have employed a strategy of maintaining smaller settlements in distant areas to retain control over resources. Glowacki's (2006) notion is pertinent in terms of its temporal and social component relative to a posited Eastern Expansion c. AD 1200-1240. In her view, the substantial increase in MVR population size is associated with the onset of community aggregation, significant modifications in socio-political organisation, and variation in the religious architectural forms that served to integrate and differentiate between these communities (Ibid: 139-143). The Socio-natural and Chacoan Revitalisation hypotheses are similar in that both notions privilege religious ideas as a structuring principle during times of social and ecological upheaval. However, a key difference is that, in the Socio-natural Hypothesis, these social transformations begin in the early 1200s rather than c. AD 1250. Thus, falsification rests upon evidence for the Pueblo III mortuary use of Wallace and other outliers after AD 1250 and the absence of evidence of the residential use of Wallace or any nearby building after AD 1150.

1.2.3 COHORT HYPOTHESIS

The Cohort Hypothesis rests upon archaeological and historical evidence that age (Gowland, 2006; Donnelly and Murphy, 2008), sex (Reinhard, 2006; Mays, 2006; 2010:32), a physical attribute (Parker Pearson, 1999:71), illness (Lee and Magilton, 1989), injury (Fiorato et al., 2007) or catastrophe (C. Bradley, 2002a; Margerison and Knüsel, 2002) can be implicated in mortuary location decisions. Accordingly, the expectation of this hypothesis is that the group of individuals selected for deposition at Wallace Ruin shared a single, observable common factor. Falsification focuses upon skeletal trauma and the demographic categories of age and sex. Since the great house contains human remains from the Pueblo II and Pueblo III Periods, this evaluation also evaluates possible changes in selection criteria over time.

1.2.4 HOUSE SOCIETY HYPOTHESIS: A MODEL APPROACH

Although the preceding hypotheses have attributes relevant to the Pueblo III use of Wallace Ruin, none addresses how spaces within the great house were used. In contrast, the house society model identifies specific components that can be assessed by hypothesis testing in terms of presence or absence. Beck's (2007) "house" model is in accordance with the notion that rights to buildings are predicated on some manner of kin relationship. As a social construct, the materiality of houses mediates relations between its members and residents of other houses through everyday practices and commemorative rituals focused upon ancestor veneration. The house serves as a nexus for various recruiting strategies employed to gain members "whose everyday practices integrated kinship, economics, religion and politics (Gillespie, 2000a:15)." Incentives to join a specific house revolve around objects that correlate with "wealth," which in turn represents "the materialization of its ideological claims to persistence and prosperity." Social memory comes into play as a mutable process that invokes or shapes "what may be said to constitute the house itself through time" in terms of the primary ideological concerns regarding fecundity, durability and cosmological potency (Beck, 2007:6). Although such considerations are most obvious in those cultures having significant socioeconomic hierarchy, Pueblo groups (Ortiz, 1969) express the concept of "wealth" primarily through socio-ritual influence or access to the most fertile fields rather than the acquisition of material goods. Lipe (1995) infers that Pueblo III Ancestral Puebloans of the Mesa Verde Region (see thesis Sections 1.4 and 2.2.2) were egalitarian in respect to a household's acquisition of abundant or exotic goods, which also applies to the vast majority of their mortuary contexts.

Mills (2015:259) states that the "architectural container of the house" thus provides the contextual association in which, through time, communally owned items, including inalienable heirlooms with iconographic connotations, are deposited within the mortuary crypt to signify veneration rites and thus the presence of bodies construed as ancestors. Accordingly, as presented by Gillespie (2000b) for Mayan populations and Mills (2008; 2015) for Ancestral Puebloans of Chaco Canyon, the house model offers a useful means to consider the role of memory in the perpetuation and innovation of mortuary decisions. As it happens, the house society model and Anthony Wallace's mazeway concept converge regarding the importance of memory and historical contingency as central components of cultural innovation and variation.

1.3 The Mazeway Defined

Although the theoretical underpinnings of the house society draw upon other scholarly sources, the model entails many of the components of the biocultural mazeway concept advanced by cultural anthropologist Anthony Wallace several decades prior. It is sheer coincidence that Bradley named Wallace Ruin after Walter Wallace, the landowner, decades before the writings of Anthony Wallace came to his attention. Yet this coincidence is apt, in that it connects the site to an interpretive concept that emphasises the complexity of factors that influence human perceptions and consequent actions. As defined by Wallace (1956a:266), the biocultural notion of the mazeway is "nature, society, culture, personality, and body image, as seen by one person" and which is related to "concepts of the self, world view and behavioral environment." Wallace (1956b: 632) explains that 'the basic function of the mazeway is to give meaning to messages, to relate incoming sensory data to the whole complex of objects, values and techniques that is the mazeway, so that action may be taken that can be expected to reduce stress or maximize pleasure not merely in the presenting situation but within the great maze of situations the mazeway represents." As such, this unique mental image, similar to the more familiar concept of a cognitive map, involves an individual's perception of his or her physical, intellectual and social world, mediated and organized by personal experience. In essence, the mazeway notion is a cognitive stress model akin to the generalised stress model of Goodman and Armelagos (1989:Fig.1), especially since both integrate Selye's (1956) research regarding the physiological response to stress.

Of note, aspects of Wallace's mazeway concept foreshadow concepts integral to the house society social organisation model, which is grounded on the action theories of Bourdieu (1977) and Giddens (1984). Among these are the capacity of an influential individual to instigate cultural renewal or innovation (Wallace, 1956a); the function of cognitive equivalence structures through which individual mazeways of members of a social group are integrated through knowledge sharing, and controlled through nonsharing (Wallace, 1970); differences between real identity versus claimed identities (Wallace and Fogelson, 1965); and the threat to existing social and symbolic systems by the introduction of new technologies (Wallace, 1995). In addition, the notion of body image is applicable in terms of the significance of the ancestral corpse. This conceptual notion also captures the maze-like movements of Ancestral Puebloans across the landscape. In her analysis of geographic metaphors expressed in Ancestral Pueblo basket and pottery motifs, Hays-Gillpin (2008) addresses the possibility that framing lines, circles, spirals, gaps or "gates", and maze-like depictions are material metaphors of "life's journeys." Possibly, maze-like design motifs represent the twists and turns, or labyrinths, Ancestral Puebloans memorialised or conceptualised regarding to and fro migrations across the Northern San Juan Region. Likewise, Washburn (2012) connects oral tradition and the insights of elders to present the case that prehistoric through historic period Hopi pottery motifs are symbolic expressions of pathways and journeys in search of the "centre place." Thus, the mazeway notion provides an apt metaphor for this study. The constellation of human perceptions represented by an individual or group mazeway prompts decisions expressed through an action. Such actions involve navigating literal and figurative pathways through social and physical spheres of the past, or, as in this scholarly journey, through disparate methods and datasets.

1.4 Previous Research on Ancestral Pueblo Mortuary Practices

Wallace Ruin is located near the east margin of the Montezuma Valley of southwest Colorado's Mesa Verde Region. This site and the other three great houses of the Lakeview Group are situated amidst a broad landscape that was completely and permanently abandoned by the terminus of the Pueblo II Period at AD 1150 (Varien et al., 2000; 2007). According to B. Bradley (1988; 2004), the great house had no Pueblo III (PIII) residential component. Brisbin and Brisbin (n.d.) make the same interpretation for the great house of Ida Jean Pueblo. The two great houses of Haynie Ruins were deliberately plundered for commercial gains and thus do not contribute to this research; however, there is no evidence that they were occupied after AD 1150, either. The absence of evidence for PIII residential occupations at Wallace and Ida Jean, together with the ostensible physical isolation of the Lakeview Group after AD 1150, means that a contextual basis for interpreting Wallace's PIII mortuary program cannot be drawn from evidence from nearby great houses or domiciles. Wallace Ruin's status as a PII Chaco outlier and, subsequently, a PIII Mesa Verde Region mortuary facility also means that it had temporal and spatial connections to communities situated across the vast expanse of the San Juan Region. Accordingly, a sound understanding of mortuary practices utilised across a broad landscape, over a period of several centuries, is required to situate Wallace's mortuary evidence within its temporal and cultural contexts.

1.4.1 MORTUARY EVIDENCE: REGIONAL ANALYSES

Yet, fine-grained, comparative studies that consider Ancestral Pueblo mortuary evidence at the scale of the San Juan Region (SJR) are extremely rare. Schlanger's (1992) study of the spatial dimensions of mortuary locations and Stanislawksi's (1963) evaluation of postural arrangement are among the exceptions. In recent years, such syntheses have instead focused upon non-mortuary deposits associated with intentional violence (LeBlanc, 1999; Harrod, 2013; Kohler and Turner, 2006; Kuckelman, 2002; Kuckelman et al., 2000; Turner and Turner, 1999). The multi-disciplinary volume *Ancient Burial Practices in the American Southwest* (Mitchell and Brunson-Hadley, 2001) does not provide an overview of mortuary research nor does it include any new information regarding the Mesa Verde Region of southwest Colorado. Furthermore, the other contributions that pertain to Ancestral Pueblo mortuary evidence are further examinations of previously published bioarchaeological studies regarding Chaco Canyon (Akins, 1986) and the La Plata Valley (Martin et al., 2001).

Although the title of the above volume suggests a synthetic approach to mortuary evidence, in her overview chapter contribution Goldstein (2001) draws attention to the contributors' focus upon site or community-specific analyses and the absence of comparative analyses, even at the level of subregions. She also highlights the limited use of spatial analyses that consider specific mortuary locations within buildings as opposed to inside-outside categories in interpretations of the social dimensions of mortuary practices. Although Goldstein's critique is directed towards the Mitchell and Brunson-Hadley volume, which includes studies from the greater US Southwest, these same two weaknesses characterise Ancestral Pueblo mortuary research.

Schlanger's (1992) unpublished yet seminal synthetic study explicitly addresses temporal and spatial variability in Ancestral Pueblo mortuary practices of the Northern San Juan Region, in which she adopts the New Archaeology approach to mortuary analysis as advanced by Saxe (1970). She relates the decisions of buriers to a complicated cultural milieu involving personal and community mobility, land tenure, environmental contingencies, and circumstantial options. Schlanger's study avoids one of the weaknesses identified by Goldstein since she utilises information from widely separated zones of the San Juan Region: the La Plata Valley of the Middle San Juan Region, Chaco Canyon and the Dolores River communities of the MVR. Yet, the temporal context is limited, with all but a few La Plata Valley sites dating to Pueblo II times.

As is the case with all but a few of the more than three hundred sources interrogated during this archival investigation, mortuary evidence is addressed on a site-by-site basis, and furthermore the data provided is generally simply descriptive and often sketchy. The site-centred approach is understandable since more than one-third of the sites are represented by just five or six primary burials at most. Their classifications by age, sex or temporal period means that comparisons between such categories would involve very small numbers.

Alternatively, researchers utilise a comparative-interpretive approach, but the information is not directly pertinent to Wallace Ruin. Stodder (1987) offers an intensive analysis of the biological and mortuary evidence regarding 66 individuals from Basketmaker III (AD 500-750), Pueblo I (AD 750-900) and Pueblo II (AD 900-1150) sites that were excavated during the Dolores Archaeological Project (DAP), one of the largest archaeological projects conducted in the United States. Although her study set the benchmark for Mesa Verde Region bioarchaeological studies, it primarily concerns the Ancestral Pueblo occupation along the Dolores River during the Basketmaker III and Pueblo I Periods. There are few Pueblo II burials and none from Pueblo III (AD 1150-1280) times.

A common situation in SJR research involves the absence of comparative analyses from communities investigated within the same project or by the same entity. Such is the case for the Mesa Verde National Park sites excavated since 1950. There is no synthetic or interpretive analysis of the well-excavated, mortuary evidence from 17 sites with more than 200 burials. Another example is provided by the Ute Mountain Ute Irrigated Lands Archaeological Project. During the 1990s, Soil Systems, Inc. conducted extensive, large-scale, intensive excavations at 42 sites within the Sleeping Ute Mountain piedmont area (Billman, 1998). This effort produced exceptionally convincing evidence regarding Pueblo II and III mortuary location preferences. Since one of the project objectives entailed removing burials that would have been destroyed by field construction, surface rooms and extramural areas, including middens and courtyards/plazas, were stripped to sterile to expose subsurface features, and subfloor test units were placed in subsurface structures. Yet, mortuary findings are described on a site-by-site basis. Comparative discussions are not provided even when a site has several individuals. Although Lambert (1999) provides a synthesis of population health of the 63 Pueblo II and III human remains recovered from 12 sites, there is no counterpart regarding mortuary evidence or an interpretation of mortuary practices from a theoretical perspective.

The lack of a synthesis of descriptive information also pertains to the large burial populations from the Chacoan satellite great house of Salmon Ruin (Reed, 2006; 2008b) and the large village at Morris 41 (Morris, 1939) of the Middle San Juan Region. The first was excavated in the 1970s whereas the latter was investigated in the 1930s. Even though the archaeological project at Salmon is heavily invested in a New Archaeology theoretical approach, neither this nor any other research perspective has carried over to an interpretation of its numerous primary burials. Espinosa (2006) provides summary information for each Salmon skeleton or skeletal element identified as a “Burial” but no synthesis or interpretation of findings.

The 172 primary burials from the domicile component of the Pueblo II-III village of Morris 41 (Morris, 1939) comprise the largest burial population from any site included in this study. The absence of a comparative and theoretical approach is not surprising considering the research timespan. No retrospective analysis has been undertaken in the years since. Morris’s evidence ranges from specific details to mere generalisations, or in several cases, no mortuary details. In his evidence summary for the site (Ibid.:115) he identifies the change in mortuary locations from middens to buildings, and that “the dead were placed in pits beneath floors of rooms still occupied, in rooms of the dwellings that were in bad repair or for some reason or another were not being used at the time, or were laid away in structures close by that had been abandoned.” However, since he provides no summaries in text or tables, interrogation of the text is required on a line by line basis. Furthermore, from various descriptions, it is evident that his overall summation captures basic trends rather than any heterogeneity in mortuary locations, including individuals in a room floor context.

In the years since Schlanger’s study, a few research projects have adopted an interpretive comparative approach to mortuary evidence. Karhu’s (2000) monograph comprises a bioarchaeological investigation of the skeletal and mortuary evidence from adjacent Sites 5MT1 and 5MT3 of Yellow Jacket Hamlet. This is an extremely important source of information since the 101 primary burials constitute the largest burial population discovered in the MVR, surpassing the 66 individuals located during the DAP project. However, as noted by Karhu (Ibid.:12), though these sites were completely excavated by the University of Colorado Museum Field School over 37 years, data quality is sometimes compromised since most burials, usually in a poor state of preservation, were excavated by students of varying levels of experience. Further complications involve inconsistencies in field practices, data recording, and research approaches. Despite these problems, Karhu evaluates the skeletal and mortuary evidence within a theoretical perspective, following Binford (1971) in which heterogeneity is considered in terms of socioeconomic status. Interestingly, burial location is not one of the variables she uses to evaluate such differences even though Yellow Jacket Hamlet has the greatest diversity mortuary location choices observed in this study. This includes the use of surface rooms, but since she pools data from two sites, determination of the numbers of individuals per site, per domicile and per room requires reference to the osteobiographies and maps she provides in the Appendices.

Karhu (2000:30) also compares YJH evidence to numerous San Juan Region sites. However, since her approach does not entail a descriptive analysis, the specific number of sites or results per variable assessed is not provided. Although Karhu includes evidence from Akins' (1986) comprehensive analysis of mortuary and skeletal evidence from Chaco Canyon, notable absences from this comparative group includes the substantial mortuary evidence from Aztec West, Morris 41 and, as discussed below, Mesa Verde National Park. However, as is typical in Southwest research, the primary focus is placed upon grave goods, flexure and body orientation. Karhu contends that the variety of burial locations at YJH, which includes surface rooms, is like that observed at the Dolores Project (Stodder, 1987) and the La Plata Valley research reported by Martin and colleagues (2001) in their *Harmony and Discord: Bioarchaeology of the La Plata Valley* monograph. She also refers to the Pueblo II-III Mesa Verde region sites described by Stodder but as reported in the *H & D* monograph.

Unfortunately, there is confusion about whether Stodder's MVR region evidence that Karhu refers to as in the *Harmony & Discord* comparative analysis, and to which she compares her YJH evidence, includes data from three large burial populations associated with MVNP Pueblo III cliff dwelling sites (Cattanach, 1980, Rohn, 1971;

Swannack, 1969). This information is reported in Table 3.12 of *H & D,* but it is not in Stodder's (1987) Table 20.7 or any other table in her monograph, presumably because there are no PIII DAP individuals. Possibly, Karhu is referring to a preliminary volume, also seen by this researcher, which was to be published in 1998. In such case, the information she refers to may have been removed prior to the actual publication date. Regardless, the information provided in the *H & D* text and tables show that locations within buildings or within rooms were not included in comparative analyses. The point of this discussion is not to criticise Karhu, who is a very careful researcher. Rather, it is to highlight the general disciplinary weakness regarding reliance on general statements and the scarcity of unequivocal, clearly presented evidence regarding Ancestral Pueblo mortuary location decisions.

The *Harmony and Discord* (Martin et al., 2001) monograph is one of the few publications in which researchers go beyond descriptive analyses. In this case, they take an integrative approach that makes use of skeletal indicators of sex, physiological stress and skeletal trauma in relation to dissimilarities in postural arrangements and mortuary location to evaluate the relationship between gender and violence in these communities. Unfortunately, information pertaining to surface rooms in these southern La Plata Valley sites is not robust in most cases since, as a salvage project, excavation of pit structures (kivas) was prioritized (Ibid.:34). Of note, Schlanger's (1992) La Plata Valley mortuary evidence also comes from these sites.

1.4.2 THE CENTRALITY OF PUEBLO BONITO: PAST AND PRESENT

Even when researchers strive to consider vertical provenience of mortuary contexts within surface rooms, site formation processes unrecognised at the time of excavation can be an impediment to the direct application of published interpretations. Most of the Chaco Canyon data used in this study involves mortuary evidence from Pueblo Bonito. A firm understanding of the mortuary evidence from this site is crucial owing to the consensus view that it held the prime position in the Chaco regional system, Bradley's (1996) supposition that the mortuary use of its rooms is referenced in the subsequent Chaco Revival movement, and Mill's (2008;

2015) notion that the mortuary rituals within these North and West Cluster rooms are integral to Chaco house society.

Two archaeologists, on behalf of different institutions, shepherded the bulk of excavation research at this principal Chaco great house. George Pepper (1909; 1920) conducted the first investigation on behalf of the Hyde Exploring Expedition (1896-1899). Neil Judd (1954; 1964) conducted research were under the auspices of the National Geographic Society-Smithsonian Institution Joint Expedition (1920-1927). Various agencies have since undertaken limited studies, but findings regarding human remains are largely from two major investigations that spanned formative years in American archaeology (Marden, 2011).

Pepper's (1909) *The Exploration of a Burial Room in Pueblo Bonito,* New Mexico is the first scholarly treatise of mortuary evidence from Chaco Canyon. Though Pepper primarily focuses upon the rich assemblage of grave goods in Room 33, this monograph also contains mortuary and skeletal information of varying quality of detail. These grave associations are unparalleled in Southwest mortuary contexts in respect to number, quality, and occurrence of exotic materials (Akins and Shelberg, 1984; Neitzel, 2003). Pepper's subsequent *Pueblo Bonito* (1920) monograph reports findings pertaining to the excavation of 198 great house rooms and locations nearby; scant information is presented regarding human remains, other than further discussion of associated material culture. Neither publication contains photographs or drawings of Pueblo Bonito mortuary contexts; moreover, there are very few photographs of architecture or *in situ* artefacts in North Cluster rooms. However, Pepper's field notebooks contain descriptions and a few rudimentary sketch maps for Rooms 32 and 33. Scans of the original handwritten field notes (CRA #1841) for Room 33, its transcript (CRA #1148), and a separate transcript of Pepper's field journal (CRA #435) are accessible online through the Chaco Research Archive (www.chacoarchive.org). Most of Pepper's field notes are repeated verbatim in his 1909 monograph, but only his field notes contain the full description of the plank flooring in Room 33 that is given significant attention in Chapter 8 of this thesis. In view of the importance of the Room 33 skeletal and grave associations to interpretations of Pueblo Bonito social hierarchy, as first proposed by Akins and

Schelberg (1984) and more recently in Mill's (2004; 2008; 2015) considerations of Chacoan house societies, it is unfortunate that these primary documents are not more detailed. However, Akins (1986:116) points out the logistical difficulties incurred by reliance on (oil) lamps and candles in the work in the Room 33, which was small and dark with roof still intact.

Judd (1954) describes mortuary evidence from the West Cluster ("Judd's Rooms") and other Bonito locations in his "Intramural Burials" chapter of *Material Culture of Pueblo Bonito.* In the view of Akins (1986:119) his descriptions are even less detailed than Pepper's, with additional information scattered through various sections of his 1954 publication. Further details involving architectural associations are available in his subsequent *Architecture of Pueblo Bonito* (Judd, 1964). As was the case for Pepper, no physical anthropologist or medical specialist was involved in the observation, recording, or interpretation of skeletal evidence at any point. However, Judd's *Material Culture* volume includes several photographs of mortuary contexts during excavation, though most document the disordered state of West Cluster burials. The eventual use of these chambers as intramural middens complicates determination of which materials are associated with mortuary contexts (Akins, 1986:119), particularly when material evidence is not rigorously associated with specific strata. Both Akins (1986) and Marden (2011) emphasise the interpretive difficulties arising from the inconsistent excavation methodology and sketchy documentation of both Pepper and Judd.

Rather than attempting to glean data from these publications, researchers have turned to Akins' (1986) oft-cited *A Biocultural Approach to Human Burials from Chaco Canyon*. This monograph contains her compilation of mortuary and skeletal evidence from Chaco Canyon. This is one of the early bioarchaeological studies conducted in the Southwest, in which she correlates biological, material culture and mortuary locations to evaluate the role of social hierarchy in mortuary location choices at Pueblo Bonito.

A significant aspect of her endeavour involved the compilation of unpublished field documentation retrieved from numerous institutions as well as the "re-association" of Judd's (1954) data to the relevant mortuary context, when possible. However, her efforts did not involve the re-association of skeletal elements (Akins, pers. comm., 2014); nor did it entail re-examination of previous archaeological interpretations. Instead, she relies upon the interpretations of Pepper (1909; 1920) and Judd (1954) regarding mortuary proveniences, as did Palkovich (1984) in her study of biological evidence from West Cluster human remains. Unfortunately, a significant problem is that Akins (1986) was only able to allocate 20 of the 91 Pueblo Bonito individuals to either a *room* or *subfloor* context in her Table 5.13. In other words, most of the individuals are eliminated from consideration and there is no distinction between depositions in a fill versus a floor context. She also pools evidence collected by Judd and Pepper in Table 5.13, so there is no means to segregate these individuals to a North or West Cluster context without recourse to her Appendix B.1. As will be discussed in Chapter 13, such a distinction is important to interpretations of house society attributes.

In contrast, Marden's (2011) focused doctoral research makes use of taphonomic and forensic evidence to re-assess skeletal and mortuary evidence from Pueblo Bonito's North Cluster, from which she makes more refined allocations to specific surface room vertical proveniences. Since field photographs are not available, her retrospective analysis primarily relies upon evidence of retained anatomic connections and associated organic materials, with some reference to Pepper's rudimentary sketch maps. As performed for Wallace Ruin, her study includes, among other considerations, the re-association of skeletal elements to obtain an accurate determination of the numbers of primary burials and rooms used for primary burial deposits. Although Chapter 8 presents this researcher's contention that Marden's identification of the specific mortuary provenience of two individuals in Room 33 is incorrect, overall, her approach and findings are extremely credible and are significant to interpretations of the North Cluster.

1.4.3 WALLACE RUIN: AN IDEAL CASE STUDY OF ANCESTRAL PUEBLO MORTUARY VARIATION

Thus, as noted above, although other San Juan Region great houses contain human remains, most were excavated in the early days of Southwest archaeology, prior to a sophisticated understanding of site formation processes and without the involvement of researchers with an osteological background. Few great houses have been excavated since then, except for Salmon Ruin. However, that site always had a substantial residential component (Reed, 2008a), which means that it can be difficult to segregate mortuary evidence from cultural deposits associated with daily life. The circumstances of Wallace Ruin thus provide a rare opportunity to address the mortuary use of rooms, or sepulchral burial, from a thoroughly excavated burial population recovered using up-to-date excavation and osteological methods. Also, the absence of a domicile component after c. AD 1150 means that its Pueblo III mortuary contexts are not intermixed with cultural deposits associated with acts of daily life, as is the case for other great houses.

1.5 Research Deficits

Considering the long history of archaeological research in the American southwest, and the extensive literature regarding a plethora of material culture and theoretical approaches employed, it is curious that focused studies on mortuary practices are so rare. As the reliability of a scientific interpretation rests upon the quality of the evidence (Ziman, 1991), this review of the literature demonstrates that there is definite need for a comprehensive compilation and examination of such evidence from the SJR study area. While such an undertaking is by itself a major contribution to Ancestral Pueblo research, the crucial factor is that the acquisition of a more extensive and representative database is essential for situating the Wallace mortuary program. It is also needed to contextualise the intentional post-depositional disturbances within local and pan-regional contexts.

The total number of SJR individuals identified is substantial, even when excluding “Burials” represented by an isolated element. However, as it currently stands, this information is not presented systematically nor in a readily accessible manner. Site-focused analyses range from poorly described mortuary loci to in-depth analyses. Also, comparative studies are remarkably uncommon and typically refer to the same datasets used in other studies. The *Harmony and Discord* (Martin et al., 2001) monograph makes use of the greatest range of comparative populations; yet, owing to publication timing, it does not include evidence from Salmon Ruin, the large burial population at Yellow Jacket Hamlet, the Ute Mountain Piedmont, and the numerous small sites scattered across the MVR.

Regarding the needs of this study, evidence pertaining to the use of surface rooms and room floors is particularly deficient, or at least obscure, and typically addressed in general terms. Comparative analyses pertaining to these loci are unusual, or, do not include Pueblo III information. Moreover, information pertaining to such scale variables as number of rooms available for use, number of rooms used for mortuary purposes, or the individuals per rooms or per mortuary context is essentially absent. On the other hand, evidence summaries and comparative frequency analyses, when provided, provide a wealth of information on demography needed to evaluate the Cohort Hypothesis and also variant mortuary practice in respect to postural arrangement at Wallace Ruin.

The, presumed, unusual circumstance of numerous primary burial deposits on Wallace Ruin's floors prompted this study's consideration of this mortuary location. Martin and colleagues (2001:224) make persuasive arguments for the need to investigate variant mortuary practices, which is the focus of this thesis. It is thus puzzling as to why neither they nor other researchers refer to the numerous primary burials in surface room contexts at Aztec West (Morris, 1924). This is a conundrum since, in this case, Morris provides a site-specific comparative analysis; moreover, his descriptions are more detailed than those pertaining to his work at Morris 41 (1939), and unlike the latter, the Aztec monograph includes photographs of *in situ* remains. Conceivably, since the use of surface rooms at Aztec West is not highlighted, there is a reasonable chance that other researchers reporting on less well-known sites have described but not drawn attention to the presence of burials on a room floor.

In contrast to the abundant comparative studies that evaluate material culture evidence pertaining to Chacoan great houses, a comprehensive evaluation of the mortuary use of these buildings is lacking, particularly regarding those of the MVR. This dearth of knowledge regarding mortuary program heterogeneity by temporal period and per great house diminishes the potential for a credible determination of the ways and extent to which the Pueblo III mortuary use of Wallace is, or is not, divergent. The same concern applies to the Pueblo II mortuary use of the North and West burial room clusters (Clusters) of Pueblo Bonito. Moreover, Akins' (1986) Chaco Canyon great house population is a fraction of the primary burial deposits identified, to the near exclusion of West Cluster individuals.

The absence of photographic documentation of surface room burials in most sites means that the retrospective analysis employed for Wallace in Chapter 6 is seldom possible. It also means that allocation to a specific surface room context is dependent upon an interpretation of often sketchy descriptions. The all-too-common failure to define mortuary context proveniences means that determinations offered may be unsound or simply inconsistent from site to site. As an example, the description "above the floor" could refer to a location several centimetres above such a surface, or slightly above. By archaeological convention, the contextual association with a floor is uncertain in the first case whereas it can be assumed in the second. When *in situ* photographs are provided in publications the evaluation of skeletal displacements, or *anthropology de terrain*, provides an opportunity for a re-assessment of the original interpretation. This potential applies to West Cluster skeletons using photographs published in Judd's (1954) *Material Culture* monograph. Marden's (2011) forensic re-analysis provides significant insight into the original versus discovered mortuary contexts. The ability to ascertain whether West Cluster mortuary contexts share the same deposition microenvironment as North Cluster individuals thus has import to this study's appraisal of the Chaco Revival Hypothesis and the house society notion for both Pueblo Bonito and Wallace Ruin.

To summarise, the acquisition of a substantial, more representative database comprised of mortuary contexts from a range of communities with a potential connection to Wallace in both Pueblo II and Pueblo III times is essential to this research. Diverse types of data are needed to evaluate several hypotheses and to substantiate the thesis that the Pueblo III use of Wallace is related to the "re-making" of a Chacoan house society. Accordingly, these lines of evidence must comprise information from great houses and, owing to the non-residential nature of the Pueblo III use of Wallace, domiciles. Although typical categories pertaining to demography and postural arrangement are included, primary attention is given to a detailed examination of spatial evidence pertaining to mortuary context locations, with greatest emphasis placed on the three vertical contexts within surface rooms. The methods used to conduct these analyses are described in Chapter 5.

1.6 Research Aims and Objectives

In consideration of the above, the two research aims of this project are to confirm that the Pueblo III mortuary program at Wallace Ruin represents a variant Ancestral Pueblo minority rite and to derive a credible explanation for its occurrence. The five research objectives are identified below.

1) Data sets will be obtained from Wallace's skeletal evidence that is situated within its diverse mortuary, archaeological, environmental and cultural contexts.
2) Comparable data sets will be obtained from other great houses and domiciles to confirm whether Wallace's Pueblo III mortuary program is anomalous, and in what ways.
3) These data sets will be used to evaluate four hypotheses regarding Wallace Ruin's ostensible variant Pueblo III mortuary program.
4) A plausible case will be made for this thesis: *The Pueblo III mortuary program at Wallace Ruin is a variant rite that entails a Mesa Verde Region reformulation of a Pueblo Bonito house society.*
5) A plausible case will be made that the deliberate disturbance of two mortuary contexts represent sanctioned intrusions to retrieve objects associated with house society ritual needs rather than efforts to violate the graves of the deceased.

1.7 Research Approach: A Bioarchaeological Study of Mortuary Variation

In her analysis of mortuary variation in Late Saxon Wessex burials, Cherryson (2008) addresses the problem of segregating unusual mortuary contexts that are variant, or representative of a minority rite, versus those that are deviant, or patently outside such bounds (see also Aspöck, 2008). She notes comparative ease in such determinations when practices are uniform in contrast to the interpretive difficulties arising when contemporary mortuary programs evidence a range of variation.

Cherryson's approach is to establish burial chronology and the range of variation observed per temporal period. Her focus is placed primarily upon interpreting the context of individual burials, mainly in terms of body positioning and energy expenditure. Yet, her point is relevant to larger groups when she states that each mortuary context must be evaluated relative to the range of variation occurring in contemporary burial practices.

Several lines of evidence are required to determine if the combination of mortuary variables at Wallace is indeed a variant Ancestral Pueblo mortuary practice. However, all fall within the parameters of a bioarchaeological research approach. As described by Buikstra (1977:69), the emerging discipline of bioarchaeology is one in which "regionally based, interdisciplinary research in mortuary site archaeology and human osteology" involves both physical anthropologists and archaeologists in the development of research designs. Even though co-operative involvement in research design is uneven in application, this approach prompted the active participation of physical anthropologists in field excavations, as in the case of this researcher. This so-called Buikstra perspective emphasises the integration of archaeological and skeletal evidence in mortuary analyses.

In contrast, the approach advocated by Larsen (2002; 2006) privileges biological evidence; as such, it is more aptly identified as the biological anthropology of past peoples. Although evaluations tend to focus upon remains recovered from a site or locality, limited attention is given to archaeological evidence otherwise (Goldstein, 2006:376). Rather, the subjects of study include paleopathological indicators of infectious disease and nutritional stress, bone chemistry assays of diet, movement across the landscape, and relatedness (also skeletal), paleodemography, taphonomic signatures of injury, and interpretations pertaining to lifestyle, population history, and violence (Larsen, 2002:120).

This interrogation of the mortuary use of Wallace Ruin draws upon both perspectives in an integrated bioarchaeological approach. Accordingly, owing to the importance of establishing the original surface room vertical provenience with certainty and the need to interpret the nature of various post-deposit disturbances, the application of *anthropologie de terrain* as advanced by Duday (2006; 2009; Duday and Guillon,

2006) is essential to this study. The significant principles of this integrative bioarchaeological method are highlighted here since it is not yet in widespread use (but see Nilsson Stutz, 2003).

1.7.1 *ANTHROPOLOGIE DE TERRAIN*: AN INTEGRATIVE METHOD

According to Pollard (2001:316), “The role of formal deposits is one of ascribing or presencing meaning, a process of signification. Within such an interpretative framework a linguistic or textual metaphor is strong. Objects are part of a material ‘language’, and through structured sets of association, separation and linkage in a deposition construct contextually specific statements.” However, Duday (2006; 2009) makes the case that such interpretations cannot be assumed. In his view (2009:14), which is followed here, the determination of a *primary burial deposit* includes the stipulation that corpse disposal occurred when the “body was still in a state of anatomic integrity”, and thus recently after death. A further complication is that even natural post-depositional disturbances can result in extensive skeletal array, to the extent that by the time of archaeological excavation, a primary burial deposit may have the appearance of a disordered, non-mortuary context (Duday, 2006:34; Weiss-Krejci, 2008).

Duday thus employs *anthropologie de terrain (adt)* a taphonomic approach that is specific to the biological and archaeological circumstances of a given mortuary context. In other words, corpse decomposition tendencies that result in movements of bones from anatomic position are considered relative to different mortuary microenvironments. In brief, in a closed space (fill) bone displacements are limited to collapse within the initial volume of the corpse or miniscule movement from anatomic position. In contrast, bones can rotate on an axis or fall beyond the initial volume of the corpse during decomposition within an open space (void). Accordingly, changes in anatomic connections associated with biological processes within *in situ* microenvironments can, usually, be segregated from other post-deposit disturbances. As applied in this study, the term *displacement* refers to the movement of bones during decomposition, *dis-association* or *re-location* refers to changes in anatomic relationships caused by animal behaviours or site formation processes, and *re-deposit* and *re-deposition* refer to the deliberate movement of skeletal remains from one location to another by humans.

1.7.2 RANGE OF MOTION: A REFINEMENT OF *ANTHROPOLOGIE DE TERRAIN*

In addition, this researcher's refinement of *adt* is introduced. This method applies *in vivo* Range of Motion criteria to skeletal remains to identify non-anatomic displacements involving large-scale movements of the lower limbs. This approach is more reliable when the post-deposit environment involves burrowing animals, and it also provides a means to identify the original postural arrangement of the lower limbs of skeletons in which the torso is supine.

1.8 Structure of the Thesis

This thesis is divided into three parts. Chapters 2 through 5 of Part A provide essential background information that leads to the identification of the problem of Wallace Ruin's unusual mortuary program. Chapters 6 through 13 of Part II present the data and comparative analyses needed to meet the research objectives and which lead to the conclusion regarding the correspondence of Wallace Ruin's Pueblo III mortuary program with Pueblo Bonito's Pueblo II house society attributes. The third part contains the appendices, which are described in the relevant chapter.

In Chapter 2, Wallace Ruin is situated within its physiographic and climatic contexts. Chapter 3 continues the focus on the contextual setting of Wallace Ruin, though in respect to its sociocultural and ritual relations across the San Juan Region. The focus of Chapter 4 is on the materials that comprise the data sets used to falsify the hypotheses. This chapter includes a detailed description of Wallace Ruin, including its research history, chronology and construction episodes, layout and use history. Chapter 5 presents the methods used to obtain the evidence needed to evaluate the hypotheses identified in Section 1.4, including a detailed presentation of the Range of Motion taphonomic method devised for this study.

Part B begins with Chapter 6's detailed presentation of the integrated bioarchaeological analysis of mortuary evidence from Wallace Ruin. This chapter makes use of evidence associated with carnivore-disturbed skeletal elements.

However, since this natural event and the subsequent human response are consequential to the decision to use the great house, the analyses and interpretations of this episode are reported in Appendix E: Carnivore Intrusion. Then, Chapters 7 through 10 focus upon a specific mortuary variant, by temporal period and in reference to Wallace Ruin. Chapter 7 establishes the occurrence of mortuary contexts in the roomblock component of comparative great houses and domiciles. The occurrence of room floor mortuary contexts in these buildings is addressed in Chapter 8. Greatest attention is paid to establishing the deposition microenvironments of burials in the North and West Cluster of Pueblo Bonito owing to their significance to the House Society Model. Chapter 9 addresses the question of whether the age-sex structure at Wallace is significantly variant from other great house and domicile sites, including whether age grading is associated with mortuary location decisions regarding room floors. Then, Chapter 10 turns to the question of whether the upright knees postural arrangement at Wallace occurs in other sites though most particularly at Pueblo Bonito. With the completion of these examinations of mortuary variation, Chapter 11 returns to the evidence for post-deposit intrusions into the great house by humans owing to the premise that these events are related to the decision to use Wallace as a mortuary facility. With the partial or complete rejection of the other three hypotheses by this stage, the case for the congruence of Wallace's Pueblo III evidence with the House Society Hypothesis is presented in Chapter 12. Finally, Chapter 13, the concluding chapter, synthesises the diverse lines of evidence used to test hypotheses and to support the thesis regarding the rationale for the use of Wallace as a mortuary facility after AD 1180. It also includes comments concerning research by-products and future research needs and possibilities.

CHAPTER 2

PRESENT AND PAST ENVIRONMENTAL SETTING

2.1 Introduction

The purpose of this chapter is to identify those physiographic and climatic conditions that may have had bearing on the decisions represented by the Wallace mortuary program and subsequent interventions. Owing to the Ancestral Pueblo reliance on dry-land (non-irrigated) farming methods, paleoclimate reconstruction has garnered considerable attention in Southwest archaeology (see especially Adams and Peterson, 1999). Therefore, historic and paleoclimate information is summarised as is pertinent to Wallace Ruin's local situation rather than the entire San Juan Region study area. Accordingly, the landscape within some 30 km of the great house receives greatest attention.

2.2 Physiographic Setting

2.1 SAN JUAN REGION

Wallace Ruin is situated the northeast quadrant of the Colorado Plateau (Figure 2.1), a vast, stable physiographic province bordered by the Sierra and Rocky mountain ranges (Baars, 1995:2). Its stratigraphy is characterized primarily by mildly deformed beds of thick sandstone and shale sedimentary deposits. Despite the Plateau's comparatively homogeneous topography, uplifting and erosion have created a landscape well-known for its wide basins, open plains, flat-topped mesas with steep talus slopes, deep canyons, entrenched river valleys and the occasional intrusive igneous formation.

The San Juan Region is situated within the Plateau's southeast quadrant, centred over the political boundaries of the Four Corners, the geographic designation for the intersection points of the state lines of Utah, Colorado, Arizona and New Mexico. Bounded on the east by the San Juan Mountains and on the west by the confluence of the San Juan and Colorado Rivers, the SJR encompasses lands drained by the San Juan River. The areas traversed by its northern tributaries are within the Northern San Juan Region (NSJR), whereas the Southern San Juan Region consists of the lands drained by the river's southern tributaries. Thus, Colorado, Utah, and a small section of New Mexico are within the Northern San Juan Region (NSJR), while much of west-central New Mexico, including Chaco Canyon, are in the SSJR.

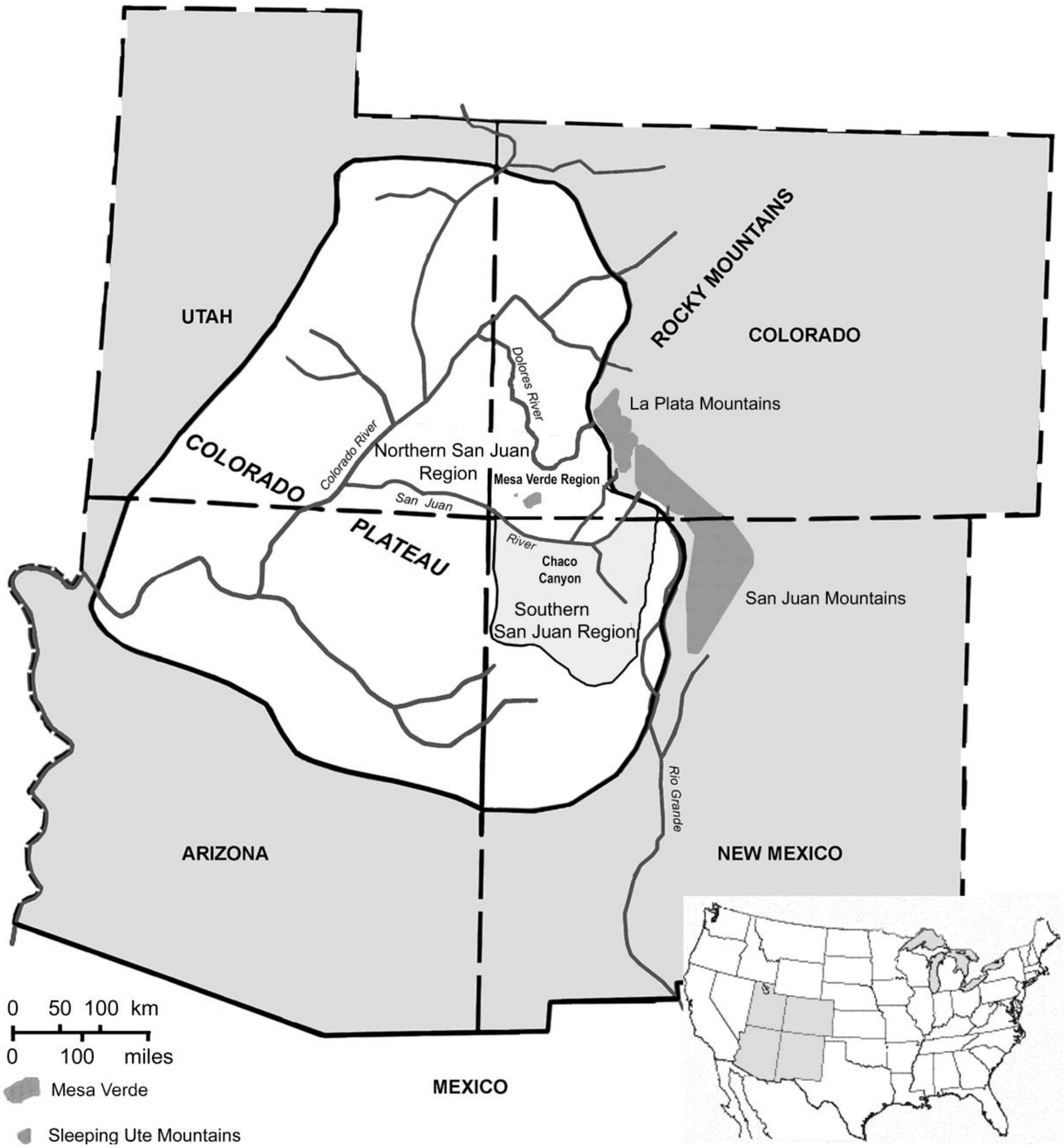


Fig. 2.1: Physical map of the Colorado Plateau, the San Juan Region and its major subdivisions.

2.2.2 MESA VERDE REGION

The Mesa Verde Region (MVR), as defined in this study, is in the eastern half of the NSJR, with boundaries largely isomorphic with Montezuma County, Colorado. Its major streams and topographic features are identified in the Figure 2.2 satellite image. With much of the terrain lying within the 1500 to 2200 m altitude band, the MVR terrain is higher, cooler and wetter than SJR landscapes within the other Four Corners states. Yet, the Dolores River is the only major, persistent stream, fed by deep snow accumulations of the San Juan Mountains. The Mancos River, with headwaters in lower elevations of the San Juans, is little more than a creek once snow melt ends. McElmo Creek, which originates south of the Dolores River and east of Wallace and proceeds westwards across the Valley and beyond, is an intermittent stream with no navigable capacity. Even so, numerous and diverse micro-environments exist due to the interplay of moisture availability, elevation, topography and soil types (Cordell et al., 2007; Johnson, 2006:38; Van West and Dean, 2000:21). Thus, when what at first glance appears to be relatively level ground is in fact interrupted by numerous small canyons and steep-sided arroyos (narrow, dry channels that become streams after heavy rain) that host variable microenvironments and which shape movement across the terrain.

2.2.2 MONTEZUMA VALLEY

The triangular Montezuma Valley covers much of the central MVR at elevations from about 1750 m to 1950 meters. Its expansive floor abuts the high, steep north face of the Mesa Verde and the eastern slopes of the Sleeping Ute Mountains. Elevations increase as the terrain sweeps to the northeast towards the high ridges that overlook the Dolores River, and they also rise as the Valley's northwest periphery gradually blends into the “uplands” terrain of the McElmo Dome. This broad, gently sloping, physiographic 'bulge' with numerous south-facing slopes is situated north of McElmo Creek, formed by the upward pressure of a vast gassy deposit of carbon dioxide upon overlying sedimentary beds (Ekren and Houser, 1965:51–52). The uppermost points of this gently rolling landscape are roughly 800 m higher than the central Montezuma Valley.

Several large landmasses provide the high topographic relief central to the regional variations in soil, precipitation, and temperature. The triangular landmass of Mesa Verde, for which this physiographic region is named, has level beds that dip to the south at a seven degree angle. Its north rim elevation exceeds 2400 metres, some 600 m higher than where its steep north escarpment meets the Valley floor. Just to the Mesa's west lies the Sleeping Ute Mountains, formed by a series of laccolithic intrusions produced by magma flows which pushed up through overlying sediments but did not erupt (Baars, 1995:6). The highest peak (3040 m) of this isolated and compact range towers over the valley.

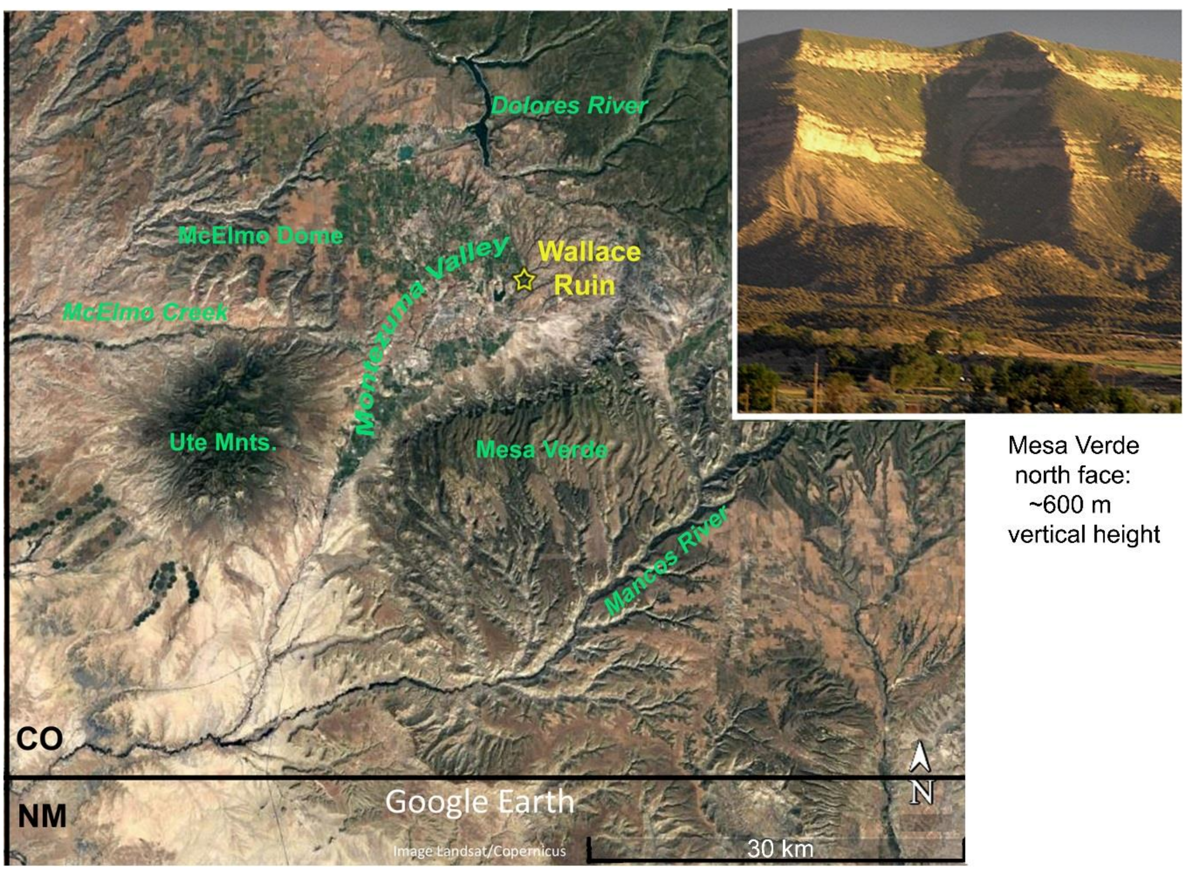


Fig.2.2: Major topographic features of the Mesa Verde Region, relative to Wallace Ruin; north face of Mesa Verde, inset.

2.3 Four Corners Climate

2.3.1 PRECIPITATION

The historic temperature and precipitation data reported in Table 2.1 are broadly consistent with typical conditions of the past few millennia, in which annual moisture levels vary directly with elevation (Adams and Peterson, 1999:49), The Four Corners has a cool, semi-arid climate characteristic although temperate montane forests cover its higher elevations. Due to its bimodal, or monsoon, type of climate most precipitation comes during two periods (Van West and Dean, 2000:20).

Table 2.1: Historic Montezuma County temperature and precipitation averages.

	Station	**Growing Season**	**Annual**	**Extremes**
Temperature	MC Fairground	27.4	17.9	39
Highs, ^{o}C	Cortez	27.4	17.9	39
	Yellowjacket	26.6	16.4	41
Lows, ^{o}C	MC Fairground	8.2	0.0	-35
	Cortez	8.2	0.0	-35
	Yellowjacket	9.0	1.2	-32
Precipitation	Cortez	2.88	33.57	84.6
cm	MC Fairground	2.57	33.57	
	Yellowjacket	3.40	40.49	172.9

Approximately 33 percent of the annual moisture occurs as snowfall during December through March, when it accumulates on the mountain peaks and falls across the lower elevations to slowly penetrate deep subsurface sediments. During the 'rainy season' of July through September, some 34 percent of the accumulations fall during episodes of torrential rain. Late spring is the driest time of year, with lowest precipitation occurring in June, followed by early fall.

2.3.2 TEMPERATURE

Even though the Four Corners has on average 240 sunny days per year, including many days throughout winter, its temperature is best characterized as moderate but subject to extreme swings. Furthermore, in early summer and early fall, high daytime temperatures can plummet at sundown, resulting in very chilly nights; freezing or near-freezing overnight temperatures can occur at any time of the year. The average daily temperature for Cortez is a moderate 10º C, but annual and daily temperature fluctuations are common and often substantial. During July, the warmest month, hot daytime temperatures commonly dip some twenty degrees by early morning; the highest recorded temperature is 39º C but the lowest a mere 3º C.

2.4 The Lakeview Group

2.4.1 CLIMATE

Wallace Ruin and the other members of the Lakeview Group are situated within the 'favoured' farming belt comprising lands at elevations between 1824 and 2195 m (Adams and Peterson, 1999: 33). As detailed in the table above, precipitation and temperatures at the Fairgrounds station three km south of Wallace are consistent with those in the central Montezuma Valley, though both are slightly warmer but drier on average than conditions recorded at the McElmo Dome’s Yellowjacket station.

2.4.2 WATER SOURCES

Although it is situated near the confluence of several tributaries of the Upper McElmo Creek, there is, presently, no permanent water source within the Lakeview Group. Currently, the nearest spring is some 800 meters to the east in Stinking Springs Draw. The large structure roughly 50 metres west of the great house may be a prehistoric reservoir. If so, Wallace and the Lakeview Group may have had a convenient source of water for prolonged periods. Totten Lake, two kilometres to its west, is a modern reservoir rather than a lake.

2.4.3 SOIL

Although the great houses of Ida Jean Pueblo and Haynie Ruin sit upon sandstone outcroppings, Wallace Ruin is positioned at a slightly lower elevation upon the almost horizontal surface of the only major alluvial fan in the MVR, created by south-flowing tributary streams of Lost Canyon, which is itself a tributary of the Dolores River. The dominant soil type in the Lakeview Group is Ramper Clay loam (type 97), a well-drained, slightly alkaline soil of high water capacity (NRCS, 1997). Such deposits are very deep; the upper 8 cm is a dark yellowish brown sandy loam that overlies a brown stratified sandy-clay loam that can be as much as 152 cm deep.

2.4.4 BIOTIC COMMUNITIES

Wallace Ruin is situated within the Sagebrush-Saltbush biotic zone. Though now surrounded by irrigated fields, the areas still covered by natural habitat are dominated by dense stands of sagebrush although prickly greasewood shrubs now cover the site. Stands of juniper trees with sparse understories of native shrubs and grasses surmount slightly elevated sandstone ridges north, east and west of the site.

Current and archaeological evidence suggests that lagomorphs and rodents dominated the faunal population of the Lakeview Group (Shelley, 1993:108). Archaeofaunal evidence suggests that prairie dogs may once have inhabited the area, but since their dens require relatively dry soil they would have been driven out of the area by modern irrigation. In recent years, badger holes and coyote dens have been observed in the residential midden south of the great house. Nearby juniper stands offer little more than protective cover, but mule deer are sometimes in the area during seasonal migrations between the Dolores River Valley and Mesa Verde.

2.5 Mesa Verde Region Growing Conditions: 11th through 13th Centuries

Throughout the prehistoric period and for much of the historic era, crop production in the Mesa Verde Region has relied upon rainfall rather than irrigation. To assess the potential of 'dry-land' farming at various times and places within the prehistoric period, researchers derive paleoclimate reconstructions by correlating evidence from tree-ring (dendroclimatic) data, moisture-retention characteristics of soils, geomorphological factors and meteorological information (Benson, 2011; Cordell et al., 2007; Dean and Van West, 2002; Kohler et al., 2007; Van West, 1994; Van West and Dean, 2000; Varien et al., 2007). The growth needs of maize receive greatest attention in terms of carrying capacity calculations since it was the staple crop of Ancestral Puebloans and has the longest growing season of their three domesticated plants. In short, during favourable convergences the MVR landscape used for maize agriculture expanded, and conversely, contracted during unfavourable convergences.

2.5.1 AD 925-1130: EXCEPTIONALLY FAVOURABLE CONVERGENCE

In their analysis of data from the Mesa Verde Region, Van West and Dean (2000:23) find that the regional paleoclimate of the 11th through 13th centuries followed the usual cycles of wet and dry climatic conditions, with short-term deviations occurring within these major trends. Following a prolonged dry period that began in the late AD 800s, good conditions for farming prevailed across all locales within the MVR from about AD 925 to 1130 (Dean and Van West, 2002:96). An exceptionally favourable convergence lasted from AD 1000 to 1130 during which precipitation variables occurred consistently and thus, predictably, in the opinion of Van West and Dean (2000:35-37). Precipitation accumulations at the centennial scale trended upward, plus inter-annual variance occurred at moderate rather than extreme levels. As a result, water tables rose, alluvial depositions built up (aggraded) flood plain soils, the size of the farming belt increased and crop productivity was high.

2.5.2 AD 1150-1180: EXCEPTIONALLY DETRIMENTAL CONVERGENCE

An exceptionally detrimental convergence began rather suddenly in the mid twelfth century, producing the most severe conditions of all droughts that occurred between AD 900 and 1500 (Dean and Van West, 2002:87). Dry conditions lasted until roughly AD 1180, with scant wet years that could have enabled plants and soil moisture to rebound (Ibid.). Van West and Dean (2000:37) identify this episode as a 'hinge point' during which at least two paleoenvironmental indicators changed concurrently. The circumstances in this case comprised the beginning of a long-term drought, floodplain degradation, and low potential agricultural production throughout the region. Even so, they argue that some micro-environments would have retained some agricultural potential.

2.5.3 AD 1180-1250: FAVOURABLE BUT LESS PREDICTABLE

Another period of exceptionally favourable conditions occurred between AD 1180 to 1250, reprising the environmental results during the favourable convergence of AD 1000 to 1130. However, this time there were two significant exceptions. Precipitation levels on the centennial scale trended downwards as inter-annual variation increased (Van West and Dean, 2000:37). As a result, growing conditions would have been increasingly less predictable even if still favourable.

2.5.4 AD 1270-1300: GREAT DROUGHT

The years between AD 1250 and 1270 were not particularly favourable or unfavourable in terms of growing conditions. However, a second 'hinge point' comprising an exceptionally detrimental convergence started to develop at about AD 1270 and lasted until 1300, producing drought, arroyo cutting, and crop shortfalls (Van West and Dean, 2000:39). Moreover, Van West and Dean (2000:35) emphasise that during this era, known as the Great Drought, the precipitation pattern was characterised by unusual fluctuations, or 'incoherence', and thus even greater unpredictability in terms of growing conditions. Assuming so, intra-regional variation in precipitation patterns due to geologic characteristics may have meant that growing conditions would have been both better and more predictable in the upland soils of Mesa Verde and the McElmo Dome compared to most locales within the Montezuma Valley. However, conditions were never so severe as to preclude maize agriculture since numerous micro-environments were still suitable for farming (Ibid.:39), including lands near Wallace.

In the words of Van West (1994:182) when referring to the carrying capacities of three great house localities at Lowry, Escalante and Wallace, “If the dates used to bracket the major Chacoan components present at these sites are reasonably correct, then Wallace’s productive primacy may be a factor in its early establishment and enduring presence in the region.” The next chapter sets the stage for the cultural factors that influenced the choices enacted in the construction, abandonment and then re-use of Wallace Ruin.

CHAPTER 3

THE CULTURAL CONTEXT OF WALLACE RUIN

3.1 Introduction

The question of identity—who these people were—was both the original question and then a persistent theme in archaeological inquiries regarding the prehistoric cultures of the southwest United States (Kidder, 1924; Kantner, 2004). As detailed in Lekson's (2009) *A History of the Ancient Southwest*, for more than a century the Ancestral Pueblo archaeological culture has received foremost attention from archaeologists and researchers of associated disciplines, a focus which played a crucial role in the development of research methods and hypotheses. In addition, Lipe (1999:51-94) provides an exhaustive presentation of the history of MVR archaeological research in terms of projects, evidence and theoretical approaches in *Colorado Prehistory: A Context for the Southern Colorado River Basin.* Information pertaining to more recent, major projects is provided below. Moreover, uncounted documentaries and publications have been generated by and for a public audience throughout the world, including Noble's (2006) volume *The Mesa Verde World*. In light of the huge body of work generated, and which is actively undertaken in the present day, the purpose of this chapter is simply to specifically situate Wallace within those aspects of Ancestral Pueblo history that have bearing on its 11th century founding and its mortuary use after AD 1180.

3.2 San Juan Region Archaeological Districts

Though Ancestral Pueblo sites are scattered across a vast, approximately 340,000 km^2 area that covers contiguous sections of the 'Four Corners' states of Arizona, Colorado, New Mexico and Utah, the greatest concentration of sites is within the east half of the San Juan River drainage. These sites include the iconic buildings on Mesa Verde, at Aztec Ruins and within Chaco Canyon for which Ancestral Puebloans are renowned and which are considered sufficiently important to merit designation as UNESCO World Heritage sites. These sites, and their associated archaeological districts, are mapped in Figure 3.1. Kidder (1924:163), the most influential archaeologist of early Southwestern research, held that the entire San Juan drainage was the “breeding ground for many of the basic traits of Southwestern culture and the center of dissemination”, but which incorporated subregional variations, or “definite areas of specialization”. Although his and others’ (Morris, 1939:37-40) usage of *Chacoan* and *Mesa Verdean* initially denoted separate cultural entities, these terms now generally refer to where people resided, or where ideas or things came from, but not particular or necessarily distinctive ethnic groups. This shift is largely the result of more recent identifications of multiple ‘to and fro’ migrations between the SSJR, MSJR and the NSJR, with the effect that the prior equating of location to either social or biological identity is much less tenable (Duff and Wilshusen, 2000; Durand et al., 2010; Lekson, 2009; Snow et al., 2015; Varien et al., 2007; Wilshusen and Van Dyke, 2006).

Fig. 3.1: Physical map of the three major archaeological districts of the eastern San Juan Region, relative to Wallace Ruin.

Still, that there are developments and community histories specific to each sub-region (Lipe, 2006; Wilshusen and Van Dyke, 2006) has bearing on understanding the cultural context of Wallace Ruin, which is both an 11th-12th centuries Chaco outlier, and, later, a locus of 13th century MVR religious and mortuary activity. During the last decade, Ancestral Pueblo research has been extremely active, with significant multi-disciplinary projects focused on the three San Juan Region sub-regions: the Chaco Synthesis (Lekson, 2006b) appraises over one hundred years of research on major aspects of the Chaco regional system, whereas the Village Ecodynamics Project (Kohler et al., 2005) utilises data compiled in the MVR during that same time. That there is a considerable overlap of both subject matter and researchers between these two projects contributes to a broader perspective and enhanced understanding of the formative and persistent relationships that shaped developments within and between these archaeological districts. In recent years, there has been a growing awareness that the territory in between, the Middle San Juan Region, was far more than an intermediate passageway between these more widely recognised archaeological regions. In the view of Reed (2008a), this southernmost section of the NSJR had its own cultural identity where north and south influences mixed with those of indigenous groups. Thus, Wallace Ruin was a constituent of both the SSJR and the NSJR, the *Chacoan* and the *Mesa Verdean*. Moreover, architectural attributes of Lakeview Group buildings point to relations more influenced by Aztec Ruin of the MSJR than Chaco. Therefore, this discussion of Wallace's cultural context begins with its Chaco roots, and then moves north.

3.3 The Chaco Phenomenon (c. AD 1050-1150)

Even though archaeological excavations of Chaco Canyon sites commenced more than a century ago (Lekson, 2006a:8; Mills, 2002:70-71), the concept of a Chacoan regional system, also termed the Chaco Phenomenon, the Chaco system, simply Chaco (Cordell, 1984: 246; Kantner, 2003:208), and the Chaco florescence (Lipe, 2006) is a fairly recent archaeological construct. At the basic, descriptive level, the Chaco system is construed as involving monumental buildings that exhibit a shared architectural technology whether located in the 'core' area within and just adjacent to Chaco Canyon, up to 15 km from the Canyon site of Pueblo Bonito in the 'Chaco halo', or in the 'outlier' sites distributed throughout and just beyond the San Juan Region (Lekson, 2006a:9). Lekson's (Ibid.:14) description of the physical parameters of the Chaco system is widely-accepted, in which the core sites form the "the geographic center of a large regional center marked by about two hundred small Great houses (sometimes called 'outliers') and roads." Most of the outliers are in the SSJR and MSJR, but as documented in Figure 3.2, several, including Wallace Ruin, are in the MVR.

3.3.1 GREAT HOUSES

The consensus opinion is that the monumental buildings, or great houses, that were directly connected to the Chacoan system must evidence Pueblo II Period construction between c. AD 1020 to 1150 (Kantner and Kintigh, 2006:155). This is because large constructions, often visible only as rubble mounds, may either pre- or post-date those which are recognised as veritable Chaco system structures (Lipe, 2006:303; Duff and Lekson, 2006). Unfortunately, a significant hindrance to interpreting either the extent or complexity of this regional system is that comparatively few supposed great house sites outside of the Chaco core have been excavated, rendering it impossible to observe whether internal architectural traits are distinctive (Van Dyke, 1999; 2003:126). Therefore, it is uncertain whether those putative 'outliers' that date to the requisite timeframe based on ceramic surface evidence were even directly connected to the Chacoan regional system, or, if they were 'Chacoesque' buildings erected by locals to emulate the sociortitual power of veritable Phenomenon sites (Ibid.:122).

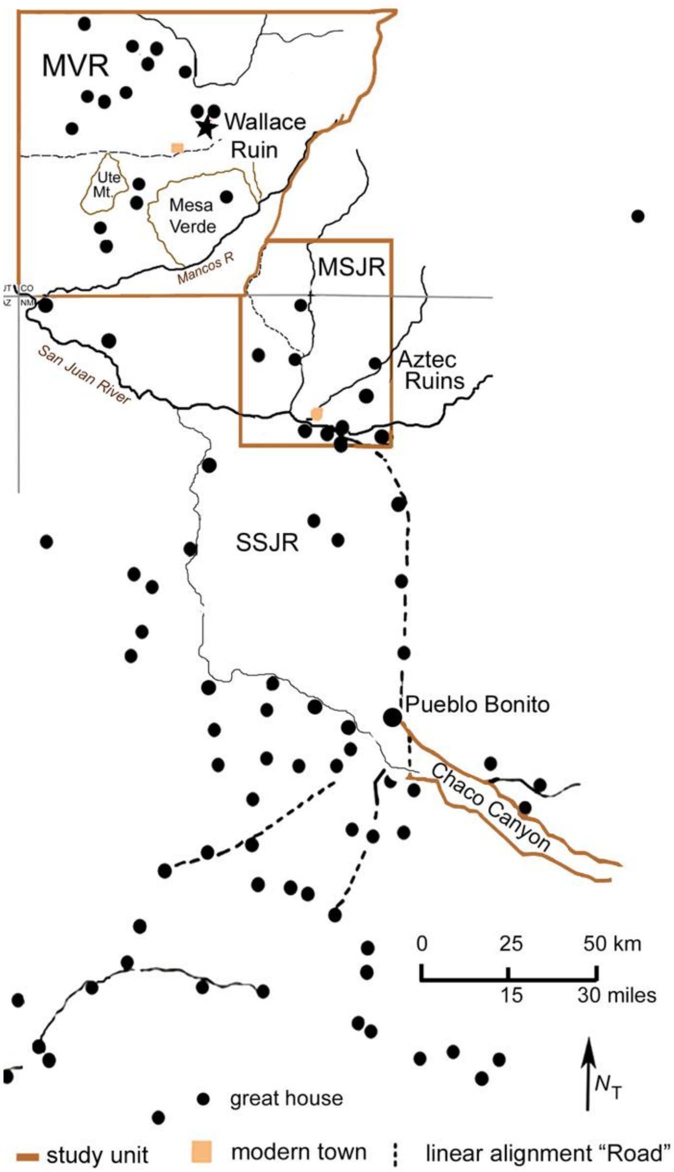


Fig. 3.2. Distribution of selected Chaco great houses of the San Juan Region, relative to Wallace and the study units used herein. Adapted from Kantner and Kintigh (2006, Fig. 5.1).

Typically, a great house is the ritual centre of a residential community that is loosely dispersed within a radius of about two kilometres (Wilshusen and Van Dyke, 2006:248), although small isolated great houses may have served as boundary markers (Kantner and Kintigh, 2006:159). Commonly cited attributes of a Chacoan community centre, many of which can be observed in unexcavated sites, include: a great house, roads, formal great kivas, water control features, earthern berms, ceremonial entrances, Dogoszhi-style ceramics (Chaco Black-on-white and Gallup Black-on-white), and such exotic materials as turquoise, obsidian, and shell (Cordell 1984:246; Kantner, 2003:210; Lipe, 2006:285-286; Toll, 2006:128).

The key element, both as an identifier of a Chacoan connection and as a marker of that system's distribution and scale, is the great house (Kantner and Kintigh, 2006:155). In the view of Lekson (2006a:10), these distinctive masonry pueblos are “monumentally upscaled versions of regular domestic structures,” adapted from previously existing Ancestral Pueblo or Chacoan architectural technologies and the product of learned experience (Lekson et al., 2006:79-80). It is thus worth noting Lipe's (2006:263-271) proposition that the pervasive and enduring architectural attributes of the 'San Juan pattern' observed in household residences are the archaeological correlates of ideological/symbolic references. Few great houses achieved the scale, artistry, complexity, or complete suite of architectural characteristics evidenced in the largest and most elaborate buildings of the Chaco core, most notably at Pueblo Bonito, from which the term *Bonito style architecture* is derived (Kantner and Kintigh, 2006:155; Lekson, 1984; Lekson et al., 2006; Sebastian, 2006:398-400; Van Dyke, 2003:122). A recent photograph and an artist’s reconstruction of this foremost Chaco great house are compiled in Figure 3.3; a scaled plan is provided in Chapter 7. Most archaeologists consider the fundamental indicators of a Chaco system great house as comprising large size, core and veneer masonry, and 'blocked-in kivas' which are placed within rather than south of the roomblock. Other common attributes include a formal, usually symmetrical layout indicative of pre-planning, levelling and terracing of the building site, sub-floor wall foundations, and massive walls of expertly coursed masonry (Lekson, 2006a:12).

On the other hand, in her comprehensive analysis of great house architecture constructed between about AD 1040 to 1100, Van Dyke (2003) finds a significant range of variation across the Four Corners, especially as the distance from Chaco Canyon increases. Mills (2002:83) advises that this diversity of outlier architectural forms is generally interpreted as evidence of the lack of direct control by Chaco core sites, and furthermore, that it is more indicative of the spread of Chacoan ideas rather than people. It seems that these monumental structures were permanently occupied only by a small number of people (Durand, 2003). However, although Reed (2008a) agrees with this interpretation, he also makes the case that the satellite great house of Salmon Ruin was unusual in that it always had a large residential population.

Fig. 3.3: Photograph of Pueblo Bonito in the present day and artist's reconstruction of this principal Chaco Phenomenon great house during its occupation. Photograph by Bob Adams, Albuquerque, NM; reconstruction created solely by NASA (public domain).

3.3.2 INTERPRETATIONS

Numerous explanations have been advanced regarding the nature of the Chaco regional system, and there is still substantial debate on the nature and extent of the integration of great house communities within the economic, political and ritual realms (Mills, 2002; Sebastian, 2006). Lekson (2006a:37) argues for a complex polity along the lines of a chiefdom or petty kingdom that is both highly integrated and hierarchical, "suffused with ritual and ceremonial but fundamentally political," and that Pueblo Bonito was the residence of its elites. LeBlanc (1999) proposes that these elites used standing armies to exact control and tribute across the Four Corners region. Most archaeologists who support the premise of 'elites' at Pueblo Bonito, however, do not go so far as construing Chaco as either an all-encompassing or militaristic system. What 'type' of elites, their role within the Chaco core sites, and what their presence may or may not imply about the social organisation in outlier communities are matters of ongoing debate (Marden, 2011; Sebastian, 2006).

In sharp contrast to the 'polity' perspective, Yoffee and co-authors (1999:266) conceptualise the Chaco system as a 'rituality'. They propose a ritual organisation based on the primacy of religious ideology as the system's *raison d'etre*, thereby rejecting the more common perspective that Chaco's ritual nature was subsidiary to its socio-political institutions. In the same vein, Renfrew (2001:21-23) advocates that the system was egalitarian in nature and that the “region functioned in terms of religious faith (supported by ritual activities including pilgrimage) rather than by a central hierarchy of persons and ideology of power.” At the heart of this system were the huge monumental buildings of the Chaco core, which Renfrew terms a Location of High Devotional Expression (LTHE). The system's underlying economic basis entailed a “sacred economy” which attracted pilgrims from across the San Juan Basin, and who voluntarily brought building materials and goods to Chaco Canyon as a “tribute” or “tithe” in exchange for non-material benefits.

In her comprehensive review of theories regarding Chaco, Mills (2002:93) makes the point that almost every model involves a social organisation based on ritual leadership, regardless of whether it was more religious or political in emphasis. Thick midden deposits of non-local ceramic styles and vessel numbers beyond the scale of what would have been produced by the relatively small Canyon population have been interpreted as representing episodes of feasting associated with temporary influxes of high numbers of people during pilgrimage fairs (Judge, 1989; Malville and Malville, 2001; Renfrew, 2001). Material culture evidence further suggests that the core sites were receivers of goods brought in from other areas rather than producers (Toll, 2006). The rich and exotic artefact assemblages found within the rooms of the core sites, especially those of Pueblo Bonito (Judd, 1954), are unmatched by those of any other Chacoan or Ancestral Pueblo site, including Aztec Ruin (Morris, 1924). Mills (2002:87) argues that “in the final assessment, it seems likely that the most important things that Chaco Canyon residents produced were relatively intangible, such as ritual knowledge, and the tangible objects used in the performance of those rituals.” In this interpretation, the Chaco core is implicitly viewed as the relationship paramount. However, Kantner and Kintigh (2006:175) construe the interplay as one of mutual interdependence, in which outlier leaders mobilised their communities to contribute essential foodstuffs, timbers, and exotic materials in exchange for ritual knowledge. They are not explicit on the means employed to galvanise participation in these ventures, but the tenor of their discussion does not implicate the use or threat of physical coercion.

Although there may well have been hierarchical aspects, particularly in the core area, the Chaco world overall was loosely coordinated (Kantner and Kintigh, 2006:175). The absence of supporting evidence for either standing armies or a robust exchange or redistribution network, along with the architectural variability in outlier great houses, indicates that core-periphery relationships were ephemeral (Ibid. 2006, 166). On the other hand, the distance of MVR outlier sites from a 'core' site would have been much reduced upon the shift of the epicentre of Chacoan power from Chaco Canyon to Aztec Ruin in the early 1100s. Eventually, nearly 50 years of drought conditions which affected the entire San Juan Region contributed to the demise, or radical change, in the Chacoan regional system (Cordell et al*.,* 2007:385).

3.4 The Mesa Verde Region During the Era of Wallace Ruin

3.4.1 AD 1050-1150: LATE PUEBLO II/THE CHACO PHENOMENON

3.4.1.1 *Chaco Outlier Communities: The Lakeview Group*

Approximately 25 Late Pueblo communities are within the Montezuma County study area (Varien, 1999; Varien et al., 2000). Most contain a large rubble mound. However, very few have been excavated professionally, and most are inferred as potential outliers simply from the size of the mound (Varien, 1999:147-148). Some could be post-Chacoan multi-roomblock buildings of 50 rooms or more, whereas others may be local Chacoesque emulations (Lipe and Varien 1999a:303). Roughly half of these large buildings are either accepted or likely Chacoan great houses, including those identified in Figure 3.4. Based on information obtained during professional excavation research, only Wallace Ruin, Ida Jean Pueblo, Escalante Ruin, Lowry Ruin (Ibid.:272-278) and Albert Porter Pueblo (Ryan, 2004) are confirmed Chaco outliers. Most researchers also include Haynie Ruins. Five more community centres are regarded as possible Chaco great houses, including Far View House and Yellow Jacket Pueblo (Lipe and Varien, 1999a:278). Varien

(1999:226) counts Yucca House as among these, whereas Glowacki (2006) infers it is a post-Chacoan building. Whether Pueblos A and B of the Mitchell Springs community, the two great houses nearest the Lakeview Group, were erected c. AD 1050 by Chacoans or if they represent "mimicking" of Chacoan ideas is unknown (Dove et al., 1997:124). Of the accepted or potential great houses, the only ones that date to the 11th century are Lowry Ruin, AD 1085-1090 (Lipe and Varien, 1999a:272), Wallace Ruin, AD 1060 (Bradley, 2004:115) and Mitchell Springs Pueblo B (Dove et al., 1997). A tree-ring date from Far View House dates to the 1050s, however, this site was excavated in the early 1900s and the site records are poor (Lipe and Varien, 1999a:273). The other, dated, great houses were built in the early 12th century.

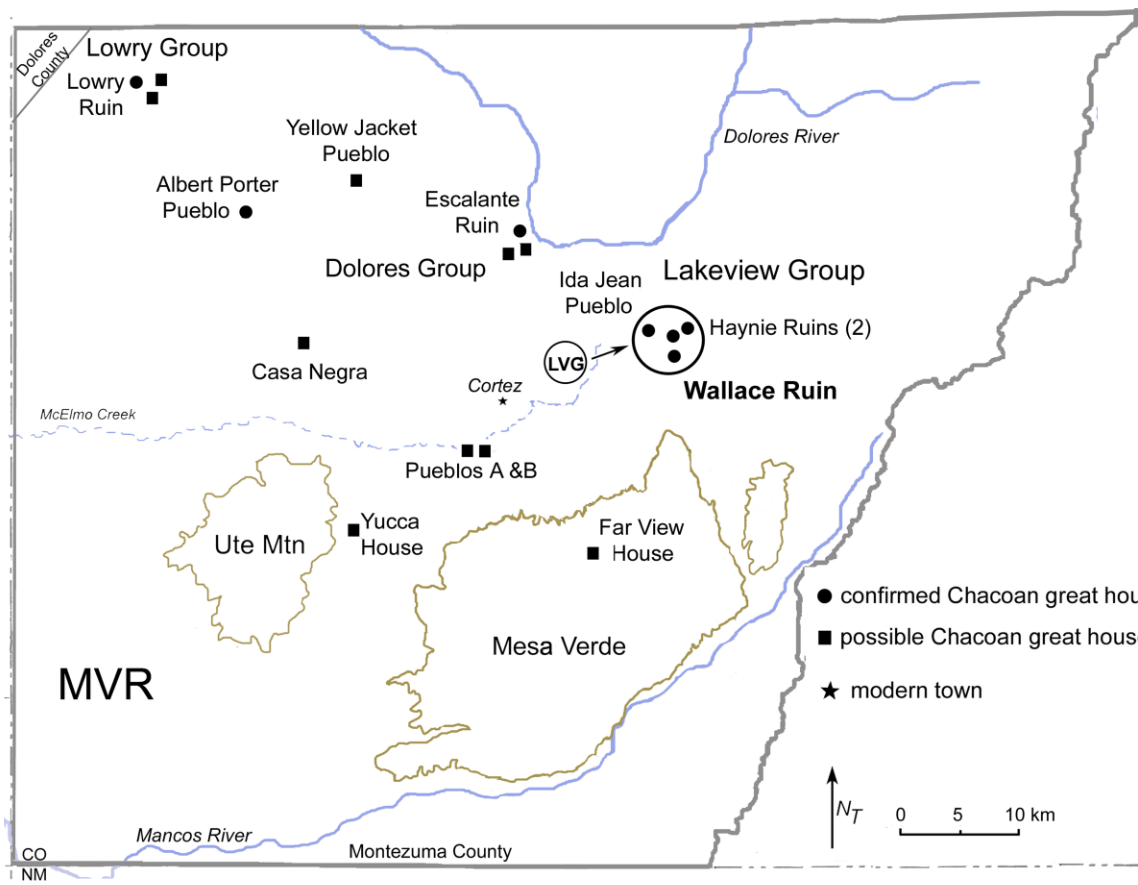


Fig. 3.4: Confirmed and possible Chacoan great houses in the MVR.

Wallace Ruin is the southernmost of four Chacoan great houses with small residential components situated within the Lakeview Group, a Pueblo II ritual community clustered within an approximate area of 0.25 square km (25 hectares) (Bradley, 1988). The location of Wallace and the great houses of Ida Jean Pueblo (5MT4126), Haynie East (5MT1905) and Haynie West (5MT1904) are highlighted in Figure 3.5. All are on private land.

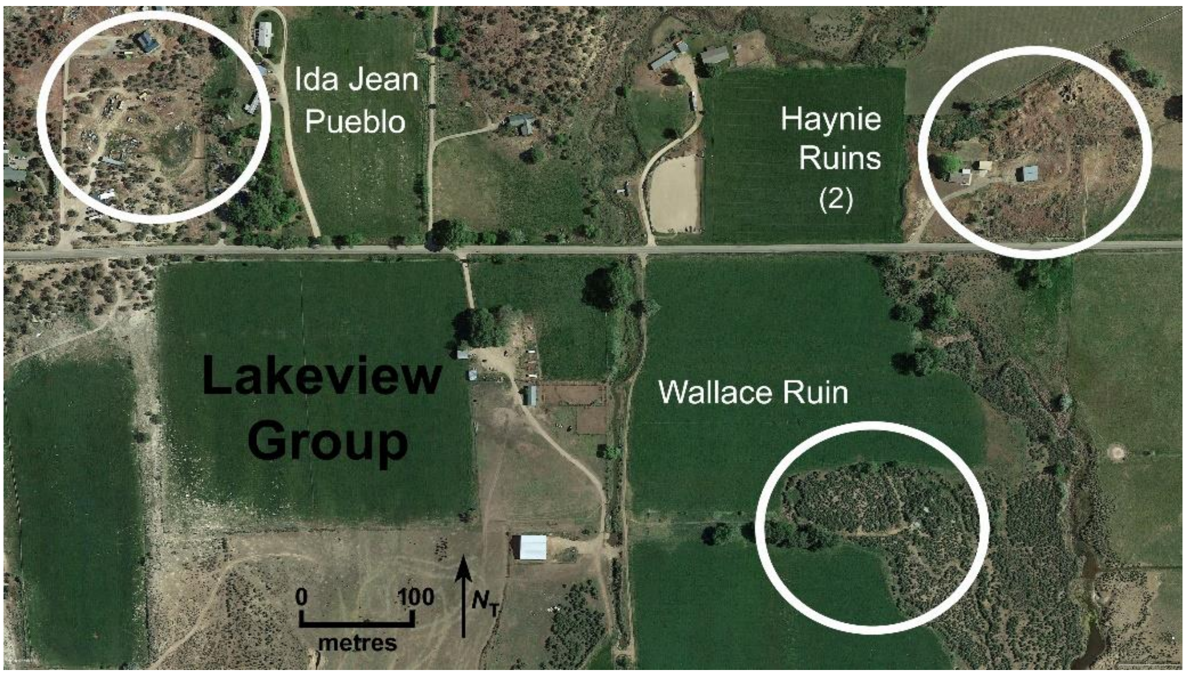


Fig. 3.5: GoogleEarth satellite image of the Lakeview Group.

Other observable permanent structures situated within the perimeter of the LVG consist of a great kiva at Ida Jean Pueblo, a probable reservoir at Wallace Ruin, and Green Stone Pueblo (Rehrer, 1993). This small domicile, situated about 50 metres west of the Wallace Ruin great house, is also included within the bounds of Site 5MT6970. In 1993, the University of Wyoming excavated several surface rooms of this unit pueblo. In addition, two small non-architectural earth mounds some 130 meters southwest of Wallace Ruin may have served as an entry feature (Bradley, 1988:8, citing Thomas Windes 1981, pers. comm.). The evidence from Haynie Ruins is particularly sketchy, but there is no evidence of major construction events or permanent residential occupations in any of these buildings after their AD 1150 abandonment (Bradley 1988; 2010a; Brisbin and Brisbin, n.d; Ryan, 2013).

The Lakeview Group fits Varien's (1999:19-23). definition of a community, in which "many households live close to one another, have regular face to face interaction, and share the use of local, social and natural resources." However, the LVG is quite unusual since only three of the 25 Pueblo II settlements noted above have more than one great house. In addition to the Lakeview Group, two are present in the Dolores Group and three form the Lowry Group. Dave Dove (2009) has since identified at least two at Mitchell Springs. In contrast, most Pueblo II community centres, as in the case of the Yellow Jacket community (Kuckelman, 2003b), contain a single large building of monumental proportions situated amidst many residential unit pueblos.

In Bradley's view (2004) the Lakeview Group's large buildings most likely provided distinct functions for a single ritual community. Alternatively, some researchers interpret its large buildings as community centres for three separate Pueblo II communities (Van West and Dean 2000; Arakawa, 2006; Glowacki, 2006). The debate is difficult to resolve until a more comprehensive survey or excavation research is accomplished. For simplicity's sake, the stance taken here is that the LVG represents a single socio-ritual community.

3.4.1.2 *Settlement Patterns: Residential communities*

Residential communities are distributed across the breadth of the MVR, though situated in cropland locations suitable for maize agriculture and generally separated from neighbouring residential clusters by several kilometres of vacant land (Varien et al., 2000:53). In his influential research on MVR household mobility and community sedentism, Varien (1999; 2002) determined that those communities established within the best soils tended to persist through time even as individual households showed marked intra-settlement mobility, perhaps in response to soil depletion. The archaeological correlate of the single household is the unit pueblo. These domiciles comprise a deep habitable pit structure, a row of several contiguous surface rooms and a midden (Prudden, 1918:54). Although isolated farmsteads are occasionally located, the Late Pueblo II regional settlement pattern is dominated by clusters of loosely dispersed unit pueblos that are frequently centred around a large building or, less commonly, a great kiva (Varien, 1999: 146-147).

3.4.1.3 *Demography*

Wallace Ruin was founded when population levels were on the rise following the near-abandonment of the region from the late 800s to the early-900s during a severe climatic downturn (Duff and Wilshusen, 2000). Using a study area which is essentially isomorphic with Montezuma County, Kohler and colleagues (2009:Tab.19.1) evaluate population patterns in terms of total momentary households. They estimate 1,385 homesteads for the Mesa Verde Region at AD 1060; by AD 1140, they predict 1,940 households. Using Duff and Wilshusen's (2000:Tab. 1) household constant of eight individuals per household provides figures of close to 11,000 people at AD 1060 and 13,000 by AD 1140. Significantly, that most of the population increase occurred in the late 1000s, concurrent with the construction of regional Chaco great houses (Ibid.: 289), might suggest the arrival of Chacoan migrants, in addition to other groups.

3.1.4.4 *Social Organisation*

The ways in which these MVR great house communities may, or may not, have interacted with each other or more typical residential communities further afield is unknown, but Bruce Bradley (2004) and Wilcox (2004) offer substantially different hypotheses, each of which incorporates Wallace Ruin. Bradley proposes the Mission Model, which involves a regional interaction network akin to that used by Spanish missionaries in New Spain. Many researchers infer that the Lakeview Group great houses of Wallace Ruin, Ida Jean Pueblo and Haynie Ruin were essentially separate community centres which had their distinct communities and resource catchments (Glowacki, 2006; Varien 1999; Varien et al*.,* 2000). Accordingly, the only factor in play is their close proximity.

Bradley, however, infers that the Lakeview Group constitutes a single mission community that developed through time. In his scheme, Wallace Ruin served as the *central mission*, providing ritual, storage and habitation spaces for the religious leaders and their families who either came from or were trained in Chaco Canyon; possibly, these leaders represented dual, east-west, religious factions. The roomblock at Ida Jean Pueblo is classed as a *habitation,* in Spanish mission nomenclature, with architectural technology and layouts based on Chacoan symbolism. *Habitations* were erected by the mission to house a general population of adherents who provided economic support, although mission-related rituals could be held there as well. The great kiva at Ida Jean Pueblo served as the *visita,* a central meeting place for religious ceremonies conducted by mission, or visiting, priests on a calendrical or as-needed basis; alternatively, a *visita* could pertain to special function rooms located within the *habitation.* The fourth component consists of the *tributary mission* established by local followers rather than the central mission. The inhabitants of these structures would thus follow local traditions in construction technology and rituals which entailed a veneer of Chacoan religious practices. In Bradley's view, Lowry Ruin initially served as a *visita,* whereas Escalante Ruin was possibly a tributary mission.

Whereas Bradley's hypothesis emphasises religious leadership, perhaps a theocracy, Wilcox proposes that great houses are part of a Chacoan system based on political authority and military force. In the Chaco Polity Model, outlier great houses such as Wallace were the seats of power for territorial chiefs, either indigenous residents or agents from Chaco Canyon, who used violent tactics to exact tribute, primarily foodstuffs, from the local residential communities before transferring it to the elite rulers of the central polity in Chaco Canyon, and eventually, Aztec Ruin. In the view of Wilcox, the mere threat of reprisals would be sufficient to maintain the “Pax Chaco” (Lekson, 2002), meaning that few great houses would need to be occupied by Chacoan agents. Wilcox also suggests that the rise of the Aztec/La Plata polity represents political independence from the Chaco polity, and that this may be related to the erection of Ida Jean Pueblo and the massive remodelling of Wallace Ruin (Wilcox, 2004:182). His perspective thus differs from Lekson's (1999) view that the construction at Aztec Ruin was due to the relocation of the Chaco elites themselves, or Reed’s (2008a) opinion that Aztec was founded by former Chaco colonists of Salmon Ruin.

In the Chaco Polity Model, polity rank-order correlates with settlement size. Therefore, within the 12-member Yellow Jacket Polity, Yellow Jacket Pueblo holds first-rank status, followed by Yucca House and then Wallace Ruin. The other Lakeview Group sites are construed as lower-ranking members of the polity. A problem with this model, perhaps implied by Wilcox's use of question marks, involves uncertainty about whether the large, unexcavated mounds at Yellow Jacket Pueblo and Yucca House were actual Chacoan great houses. Still, despite the significant interpretive differences between these two hypotheses, there are no interpretations that suggest that a rival socio-ritual or socio-political system was present in the Mesa Verde Region. Rather, it is likely that most people lived by 'local rules' revolving around kin and non-kin relationships (Kohler et al., 2005:282; Kohler et al., 2007: 91) and marriage (Varien, 1999:213), in conjunction with, or despite, influences of the Chacoan regional system (Lipe, 2006).

3.4.1.5 *Violence*

As with all things Chaco, archaeological opinion is divided, though in this instance it pertains to the role of the Chaco system in acts of violence in MVR and other locales. Turner and Turner (1999), Lekson (2002) and Kohler and colleagues (2009) echo Wilcox's (2004) theme that the Chaco polity ordered coercive incidents involving brutality and massacres to establish or maintain control over the local population. However, other scholars hold that the violence that took place in the Late Pueblo II-Early Pueblo III Period is more likely associated with indigenous responses to social upheaval consequential to the breakdown of the Chacoan, or Chaco-Aztec, regional system (Billman et al., 2000; Glowacki, 2006; Lipe, 2006; White, 1992).

In their oft-cited publication on Ancestral Pueblo violence between AD 900-1300, Kuckelman and colleagues (2000:Tab.1) performed a literature review of sites for which evidence of lethal violence involving multiple victims has been reported. The most severe cases involve extreme peri-mortem processing (EP), which comprises skeletal dismemberment, extensive bone fragmentation, and occasionally anthropophagy (the consumption of human flesh); it also seems that families or small residential groups, rather than individuals, were targeted (Billman et al., 2000; Kuckelman et al., 2000; Lambert, 2014; White, 1992). Kuckelman's group identifies 30 sites in the Northern San Juan Region, 16 of which are within the MVR study area. Potentially, 10 to 12 of these 16 incidents could date to the Chaco Phenomenon. A construction date of 1025-1050 situates one just prior to the construction of the first great houses in Chaco Canyon and possibly well before the construction of either Wallace Ruin or Lowry Ruin. Four date between AD 1050 and 1150, of which three post-date AD 1100. Another five or six sites cluster around the mid-1100s, so some or all of these Late Pueblo II or Early Pueblo III sites may have been inhabited during the period in which the Chacoan system was weakening or coming to an end. Two more sites cannot be classed other than Pueblo II or Pueblo III. As concluded by Kuckelman and colleagues, 'Chaco-sponsored terrorism' is not supported by the evidence since similar episodes of EP violence occur both before and after the Chaco era. They also contest that antemortem damage may result from a variety of circumstances, including several that are unrelated to political motives.

3.4.2 AD 1150-1225: EARLY PUEBLO III/ POST-CHACOAN TRANSITION

3.4.2.1 *Public Architecture*

There is no evidence to suggest that Chaco great houses continued to be used as formal ritual or socio-political centres in the Early Pueblo III Period. Lipe (2006:302) advises that although these buildings may have retained significant ceremonial or social status, surface evidence indicates many were appropriated for residential use by several households. Mitchell Springs Pueblo A, located about 10 km from Wallace Ruin, is such an example.

3.4.2.2 *Settlement Patterns: Residential Communities*

Two significant changes in regional settlement patterns have been identified for the AD 1150-1225 interval, pertaining to the configuration and location of residential communities (Adler, 1992; Glowacki, 2006: Fig. 3; Varien, 1999:148; Varien et al., 2000; Varien et al., 2007). Small and somewhat isolated unit pueblos are present along canyon floors and mesa tops, but the initial stages of community aggregation are represented by settlement clusters of two to four roomblocks some 10 to 30 m apart (Glowacki, 2006: 26; Varien, 1999:148). In addition, these roomblocks frequently comprise multi-component unit pueblos for two or three households (Adler, 1990:264-270; 1992:20).

Varien (1999:148) identifies 44 multi-roomblock residential communities for this period, with each averaging roughly 170 people (Mahoney et al., 2000:Tab. 3). Many of these cluster within localities having an approximate 2 km radius. Most are situated amidst prime cropland on Mesa Verde and the McElmo Dome. As can be seen in the Figure 3.6 landscape map of the distribution of Pueblo II and Pueblo III sites of the east half of the MVR study area, no communities existed along the Dolores River or in the eastern Montezuma Valley after AD 1150, or within 10 kilometres of Wallace Ruin. Moreover, no domiciles within that radius are associated with Mesa Verde Black-on-white, the diagnostic ware that appears c. AD 1180. In addition, this researcher's more recent interrogation of the Colorado Office of Historic Preservation cultural resource database (accessed, 2010) confirms the absence of this ceramic style among isolated finds associated with campsites or 'pot drops' within seven kilometres of Wallace Ruin. Nor are there reports of small masonry field houses that would have served as storage buildings or provided temporary accommodation. From this evidence, between AD 1150 and 1225, the settlement closest to Wallace was at Mitchell Springs.

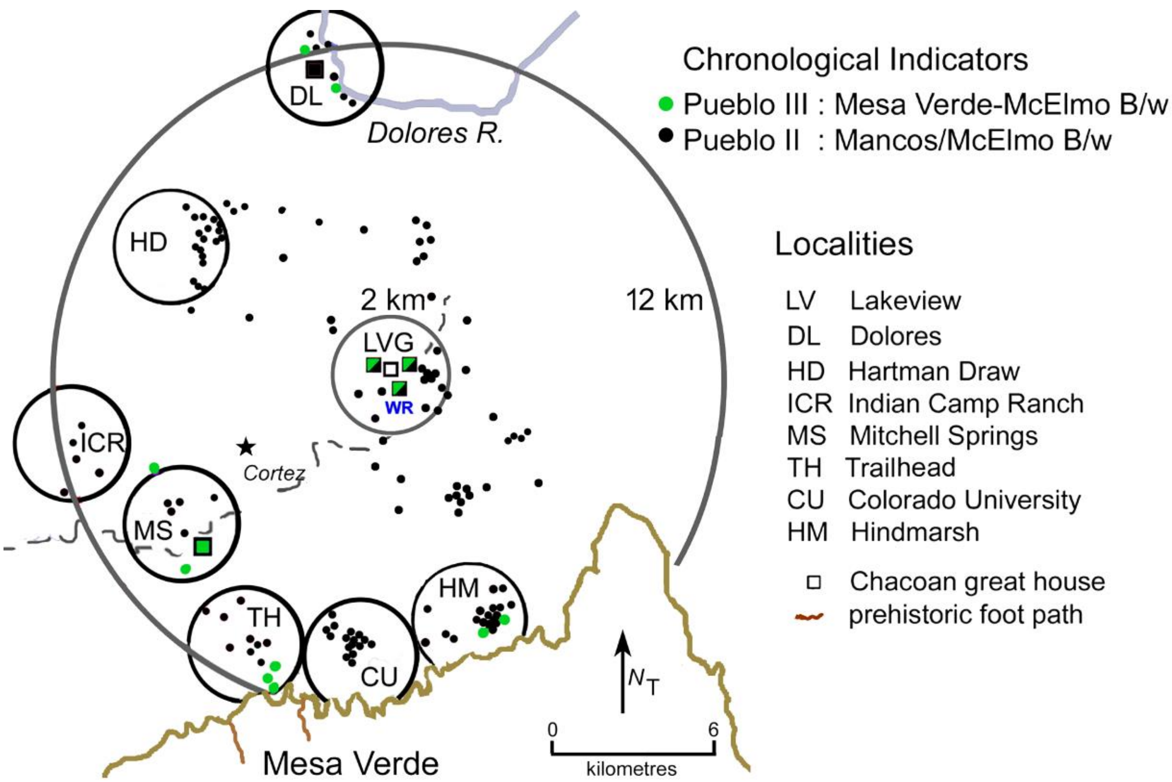


Fig. 3.6: Locations of domicile sites within 12 km of Wallace Ruin and LVG great houses, per period and by residential localities with a 2 km radius. Note the rare occurrence of ceramic assemblages with Mesa Verde B/w pottery, including isolated finds and temporary campsites.

3.4.2.3 *Demography*

In 1999, Varien proposed that the paucity of cutting dates between AD 1150 and 1180 suggested a short-term regional emigration during a severe climatic downturn. Roney (1995:179) identifies a population influx from the NSJR into north-central New Mexico at about this time. However, there is no evidence of large-scale migrations from the MVR to other San Juan regions. Shared attributes in San Juan Region material culture may mask the extent to which MVR population numbers between AD 1150 and 1180 represent contemporaneous "in and out" migrations of individuals, lineages, or communities. However, there is broad agreement that the 1180s marked the beginning of a significant increase in population over the next four decades, largely due to immigration from the western NSJR in the early 1200s (Glowacki, 2006:140). Varien and colleagues (2000) estimate that by 1225, the population residing within the central-east Montezuma Valley numbered some 20,000 individuals.

3.4.2.4 *Social Organisation*

The more elaborate and formal architectural technology characteristic of civic architecture is not found even in Early Pueblo III community centre multi-roomblocks, and in Lipe's view (2006:304-310) the absence of civic architecture suggests low levels of socio-political integration and political hierarchy. He infers that in the post-Chacoan era, MVR communities were politically independent and probably competitive. Glowacki (2006:139) infers that the stability provided by long-lived, persistent community centres contributed to the social developments associated with population growth and village aggregation in the early 1200s.

Yet, regardless of whether such communal facilities existed to enhance or direct community interactions, the residential kiva continued to serve as a nexus for ritual and everyday needs, providing a lived experience in which cultural metaphors, historical practice, household rituals and social memory were reconstituted on a recurrent if not daily basis. Ortman (2000:638), citing Brody and Swentzell (1996) and Swentzell (1990), explains that among some Pueblo groups, round kiva architectural attributes are material metaphors for the notion that the cosmos is a container composed of an earth-bowl below and an inverted sky-basket above.

Accordingly, the metaphor (expressed in small caps by convention) KIVA WALLS ARE POTTERY VESSELS stands for THE EARTH IS A POTTERY BOWL. Based on his analyses of MVR material culture, Ortman (2010:406-415) identifies THE WORLD CONSISTS OF CONTAINERS as an MVR metaphor that amalgamates these ancient metaphors.

3.4.2.5 *Violence*

No larger-scale and severe episodes of violence are attributed to the 1180-1225 interval in the MVR or any other NSJR locality (Kuckelman et al*.,* 2000). Kohler and colleagues (2009) also report a very low level of violence against individuals in the MVR. Even though no violent episodes have been identified in the eastern Montezuma Valley, it is possible that the indefensibility of the flat "eastern marches" prompted the abandonment of that area by about AD 1150 (Varien et al., 2007:293), even if only in response to a perceived threat. Thus, it is interesting that the similarly indefensible communities at Mitchell Springs persisted and new ones were established at Yucca House and Mud Springs, even though each was positioned much nearer to sites with evidence of severe outbreaks of violence than the Lakeview community. Whether the Mud Springs and Yucca House communities were founded by survivors, members of eastern Montezuma Valley settlements, both or others is indeterminate. Rather, despite the trend towards community aggregation and clustering, easy access to good cropland superseded concerns regarding the actual or perceived threat of violence: settlements either remained in or were established in mesa-top locations and many farmsteads were still somewhat dispersed.

3.4.3 AD 1225-1300: LATE PUEBLO III/MESA VERDE FLORESCENCE

3.4.3.1 *Public architecture*

Although many of the architectural forms would be new ways of "imagining the community" (Ortman and Bradley, 2002: 73), the mid-1200s witnessed a reprise of the Chacoan emphasis on public architecture in terms of pre-planned village layouts, the use of special function buildings, and monumental architecture (Bradley, 1992; Lipe and Ortman, 2000; Ortman, 2008). However, whilst the large aggregated villages of the mid-1200s were larger than a Chaco outlier community, as for example

Sand Canyon Pueblo (Fig. 3.7), rarely would a single building within a village approach the scale of a medium-sized Chacoan great house such as Wallace Ruin. Glowacki (2006) provides an excellent description of these Pueblo III architectural forms and the interpretations proffered by various archaeologists, most notably regarding Sand Canyon Pueblo (B. Bradley, 1993; 1996; Lipe and Ortman, 2000; Ortman and Bradley, 2002).

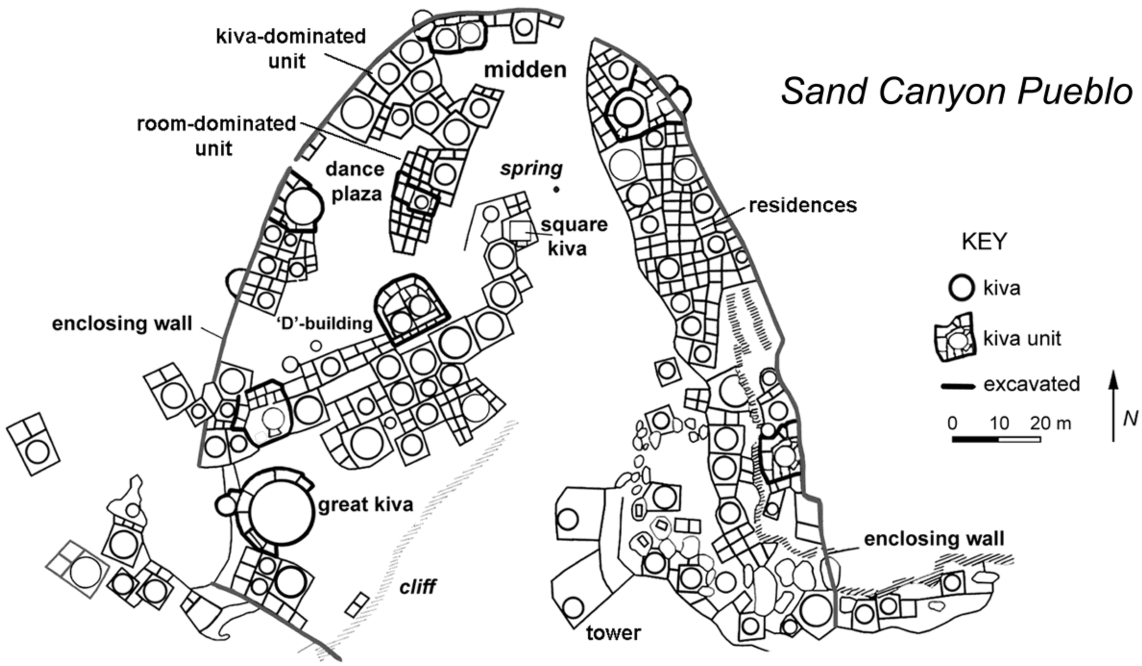


Fig. 3.7. Bilateral village layout, public-residential location asymmetry, and architectural forms found in Late Pueblo III villages. Adapted from a map of Sand Canyon Pueblo in Lipe (1999: Fig.9.8).

3.4.3.2 *Settlement patterns: residential communities*

By 1225, the last Montezuma Valley communities at Mitchell Springs and Mud Springs were abandoned, though not those at nearby Yucca House (Varien, 1999:Tab. 7.3). Elsewhere, the move towards aggregation continued apace, with most people moving into large and now tightly compact villages (Varien, 1999). Fifty-nine Late Pueblo III communities have been identified in the MVR (Ibid.:149). Several are on Mesa Verde but 36 are located within a relatively narrow, east to west diagonal band that transects the McElmo Dome (Varien, 2002:178); the large Pueblo III aggregated village at Cowboy Wash is separated from this cluster by the Sleeping Ute Mountains. Between AD 1225 and 1260 the largest village was at Yellow Jacket

(Kohler et al., 2007:82), with perhaps as many as 134 households. Kuckelman (2003) estimates a high of 850 to 1,350 people at AD 1225, followed by a substantial population decline over the next few decades.

While the trend towards aggregation involved the continuation of an existing trend, the shift to canyon head and cliff-alcove locations of Mesa Verde and the west MVR in the mid-1200s marked one of the more significant departures from Ancestral Pueblo practice (Ortman et al., 2000). Varien (1999:213) proposes that the change from usufruct land-use rights to one based on heritability enabled the shift from dwelling locations amidst cropland to villages erected upon sandstone bedrock outcrops along canyon rims. Large aggregated villages with several hundred residents were established at Sand Canyon Pueblo and Goodman Point Pueblo in the mid-1200s (Ibid.:149) at about the time that the smaller village of Castle Rock Pueblo was founded along the north side of the McElmo River. Even though the vacant lands in eastern Montezuma Valley were suitable for maize agriculture (Van West, 1994), the settlement pattern in the prime farmlands of the McElmo Dome was nevertheless one of “territorial compression” (Kohler, 2000:98) involving considerable overlap of community resource catchments (Varien et al., 2000:53). It is unknown whether the eastern Valley lands contained no communities because of climatic variables, because they were part of a "buffer zone" between MVR and MSJR communities (Kuckelman, 2002:237), or other reasons.

3.4.3.3 *Demography*

Cold, dry conditions in other parts of the San Juan drainage seemingly fuelled rapid population growth into the MVR "refugium" during the early to mid-1200s (Kohler et al., 2007:101). Possibly, immigrants from more environmentally stressed locales were attracted to the area by new beliefs and practices that seemingly secured favourable growing conditions (Glowacki, 2006). The correlation of Kohler and colleagues’ (2009:Tab.19.1) estimated momentary population of 3,234 households at AD 1260, with Duff and Wilshusen's (2000:Tab.2) Ancestral Pueblo constant of eight people per household yields a MVR momentary population of almost 26,000 people. Within the next twenty years, population levels experienced a gradual but persistent decline. The rapid, total and final Ancestral Pueblo depopulation of the

MVR occurred soon thereafter, as early as AD 1280 but certainly by 1290 (Lipe and Varien, 1999b:312), even though the carrying capacity would still have supported 1,400 households (Kohler et al., 2009: Fig. 19.1). The entire Northern San Juan Region was vacated by the very early 1300s, with groups relocating to the vicinity of the Hopi villages of northeast Arizona or along the northern Rio Grande of New Mexico (Cordell, 1984; Kantner, 2004).

3.4.3.4 *Social organisation*

A range of archaeological evidence indicates that a central polity did not dominate the MVR during the 13th century (Lipe and Varien, 1999b:331). In his assessment of social power in the late Pueblo III, Lipe (2002:223-224) holds that the public architecture found in most community centres represents competitive displays of social power, especially between the largest villages, where individuals and groups mobilised communal feasts and rituals to promote intra-community allegiances and concord. Moreover, whilst Lipe does not consider the late Pueblo III social organisation as strongly hierarchical, he postulates that either "individuals or groups had an increased ability to control the use of community space, mobilize fairly large construction efforts, accumulate and distribute stored food or other goods, and organize group rituals and assemblies" (Ibid.:224). Apparently, the number and variety of the ritual spaces created and used indicates that socio-religious practices followed two different pathways--the communal and the secretive. Ortman and Bradley (2002) infer that the unroofed great kiva and plaza at Sand Canyon Pueblo were places for public ceremonies and communal feasting, whereas the complicated route for accessing the interior of the D-shaped building suggests restricted access and constraints on the number of ritual participants.

This return to archaeologically-visible ritual expression echoes Chaco Phenomenon traits. However, unlike the "polity versus rituality" debate for that social organisation, the developments in the late Pueblo III are largely viewed by archaeologists as being fundamentally religious in nature (Bradley, 1996; Glowacki, 2006). This perspective is largely shaped by the absence of artefact, architectural, or mortuary evidence of political aggrandisement that is normally associated with "maximum leaders," especially during a period of warfare (Lipe, 2002:231). The shift to new, or renewed, architectural forms took place when growing conditions were favourable in the MVR but not in other parts of the San Juan Region. Since the better cropland was already occupied, immigrants from more environmentally stressed sub-regions may have been attracted to social conditions existing in the MVR (Glowacki 2006:151); this would include beliefs and practices that seemed proficient in securing favourable growing conditions. As described by Lipe (2006), Chacoan ceremonialism is derived from concepts central to the existing Northern San Juan Pattern. In Glowacki's (2006:147) opinion, the use of novel architectural forms in the thirteenth century MVR may well have been associated with an alternative, indigenous NSJP trajectory. In contrast, Bradley (1996) proposes that they represent a re-emphasis on Chacoan metaphors in response to the Kachina cult developing beyond San Juan regions.

Previously, the option of residence dispersal provided an adaptive solution during environmental downturns (Dean and Van West, 2002), but for some reason, this strategy was not utilised in the 1280s. Possibly, land tenure rules may have constrained a flexible response to cropland availability. It is also possible that people did not take up residence in more dispersed locations due to the threat of violence, some of which may have resulted from tensions involving different 'local rules' regarding rights to peripheral farm lands (Varien, 1999:216). Alternatively, the religious outlook that seems to have dominated the late 1200s may have made it essential for adherents to reside near a ritual centre. Given that the Great Drought began in the 1270s (Dean and Van West, 2002), it is possible that corporate social organisations did not have the capacity, or power, to resolve disputes during an environmental downturn (Knauft, 1987). Moreover, the religious nature of the social organisation, and the likelihood that the dearth of rainfall was construed as the fault of religious "nonconformists," perhaps prompted some of the episodes of violence against individuals, groups, and even entire villages that occurred at the end of the Ancestral Pueblo occupation of the MVR (C. Bradley 1998; 2002).

3.4.3.5 *Violence*

In his study on patterns of warfare in the prehistoric American Southwest, Stephen LeBlanc (1999:162-186) uses such archaeological data as burned structures, rock art, site locations and buffer zones to argue that violence was both a recurrent and significant problem throughout the Pueblo III Period. Kohler and Turner (2006) raise the possibility that members of the Aztec/MSJR locality frequently raided the MVR for females during the AD 1200s based on their comparison of sex ratios within the San Juan Basin. Such recurrent and widespread violence is frequently cited as the impetus for movements to more defensible aggregated villages in canyon locations in the mid-1200s (Glowacki, 2006; Lekson, 2002; Lipe, 1995; 2006; Lipe and Varien, 1999b).

Nonetheless, MVR skeletal evidence indicates otherwise. Both Kuckelman and colleagues (2000) and Kohler and co-authors (2009) find that once the mid-1100s violence subsided, attacks against either groups or individuals were rare in the MVR until the very last years of the Ancestral Pueblo occupation. The late 1200s is quite a different story, though. Kuckelman's group identifies two episodes in which many or most of the members of two villages were massacred, so probably more than 100 people per incident. The attack on Castle Rock Pueblo took place in the late 1270s, and the one at Sand Canyon Pueblo probably transpired about AD 1280 (C. Bradley, 1998; 2002; Kuckelman and Martin, 2007). Both episodes appear to have involved violence on a massive scale, and demographic analyses suggest each involved an attempt to kill all or many members of both villages. Although there are differences in post-mortem treatment of the skeletons, neither episode rises to the level of an EP event (Kuckelman et al*.,* 2000:158).

In the years since the above studies were conducted, non-buried human remains with evidence of skeletal trauma c. AD 1280 have been located at Goodman Point Pueblo (Kuckelman et al., 2009:64-65). Likewise, some scattered human remains in nonburial contexts may mean that residents of Yellow Jacket Pueblo were killed at about the time of that site's abandonment in the late 1200s; unfortunately, the very poor condition of the bones prevents reliable assessment of perimortem damage, plus it is unknown if these bones were found in their initial depositional context due to site disturbances in the historic period (C. Bradley, 2003). In each of the publications cited above, as well as in this author's separate research on the skeletal and mortuary circumstances of the children of Sand Canyon Pueblo (C. Bradley, 1998; 2002), the conjunction of skeletal trauma and the apparent absence of any formal mortuary behaviour is interpreted as indicative of the rapid abandonment of these villages as well as the final depopulation of the region.

3.5 Conclusions

This chapter situates Wallace in terms of the broader cultural influences on its founding, original function and subsequent re-use. This summary overview establishes that Ancestral Pueblo groups were diverse in terms of ethnicity, language and local history. Their long-standing residential mobility settlement pattern involved numerous movements of individuals across the landscape within and between archaeological regions, apparently prompted, or at least influenced, by deteriorating environmental and social circumstances. Yet, these movements provided an integrative mechanism for the circulation of ideas, architectural technology, material culture, and the blending of families. During the Chaco Phenomenon, pilgrimages to Chaco Canyon would have provided additional opportunities for socio-ritual interactions, as did the establishment of Chaco outliers, or emulations thereof. These Chacoan influences played a direct role in the establishment of Wallace and they would be recalled, in ways influenced by local MVR notions, in the mortuary use of the great house after AD 1180. Throughout this timespan, ritual/religious concepts were an integral part of everyday life, though expressed most manifestly during the Chaco Phenomenon and then again after AD 1250. On the other hand, apart from the timespan associated with the breakdown of the Phenomenon and the end of occupation of the Four Corners at c.1280, large-scale violence is not archaeologically visible. Still, even though the final stages of the regional depopulation took place during a climatic downturn, environmental studies indicate that the carrying capacity was still sufficient to support a sizeable population (Van West, 1994; Dean and Van West, 2002; Kohler et al., 2009). Hence, social factors comprising both "push" and "pull" elements seem to have significantly influenced decisions regarding abandonment as well as the failure to re-occupy the area upon the return of favourable growing conditions, in sharp contrast to the long-standing pattern (Lipe, 1995; Lipe and Varien, 1999:339-343). As in previous pan-regional relocations, some people probably followed migration streams that connected people across the miles through marriage, kinship or exchange networks (Wilshusen and Ortman, 1999; Wilshusen and Van Dyke, 2006) and biological reproduction (Ortman, 2010).

This chapter also provides grounds for rejection of the spatial component of the Socio-natural Hypothesis in terms of the possibility that the Pueblo III mortuary use of Wallace Ruin is founded on an economic impetus to establish rights to nearby farmlands. First, there is no evidence to suggest that any building within seven km of Wallace was established or used as a permanent residence after AD 1150, whether great house or domicile. Secondly, no material culture evidence suggests that any campsites or isolated finds within this radius are associated with farming activities or an Ancestral Pueblo presence after AD 1180. The next chapter provides detailed information about Wallace Ruin, including its occupation history. It also includes summary statements regarding data sets from the sites used for comparative analyses. Finally, the temporal component of the Socio-natural and Chaco Revival hypotheses is addressed in Chapter 6.

CHAPTER 4

MATERIALS: WALLACE RUIN AND BEYOND

4.1 Introduction

To meet the aims of the thesis, this researcher developed two data sets: the acquisition of mortuary evidence from Wallace Ruin to achieve Research Objective 1; and, the acquisition of comparative Pueblo II and Pueblo III data from San Juan Region sites to meet Objective 2. Very detailed background information on Wallace Ruin is provided below since questions regarding its mortuary program drive this doctoral study. As advised in Chapter 1, “structure life history” information per multi-storey roomblock structure, including profile maps generated by this researcher or Bruce Bradley, are available in Appendix A for cross-referencing. This chapter also includes information on Ida Jean Pueblo and Haynie Ruins, owing to their inclusion in the Lakeview Group and because information on their excavation history is not readily available. Summary information regarding comparative sites and burial populations is also provided herein, though specific details and maps are provided in the relevant comparative chapters. Landscape maps that situate these sites by major archaeological districts are provided in Chapters 3, 7 and 8. Owing to this study’s emphasis on spatial evidence, this thesis makes heavy use of roomblock plans adapted by this researcher. These include every great house with a primary burial in a room mortuary context and the residential sites 5MT3 (Karhu, 2000), 5MV34 (O’Bryan, 1950) and Morris 41 (Morris, 1939) since they are accorded special mention. In addition, three appendices report details pertaining to primary burials: Appendix B reports mortuary evidence per Wallace Ruin’s Pueblo II and Pueblo III *in situ* primary burial deposits (16); Appendix C provides osteobiographies that focus upon biological information from Wallace’s Pueblo III *in situ* depositions (10) and Individual Links (4) classed as a primary burial; and Appendix D reports contextual, demographic, and postural arrangement data per San Juan Region primary burial.

4.2 Wallace Ruin (5MT6970)

4.2.1 RESEARCH HISTORY

The first recorded information about Wallace Ruin comes from Cliff Chappell, a local antiquarian of the mid-twentieth century who 'worked' sites throughout Montezuma County. His diary, compiled in the early 1950s and now archived at the Anasazi Heritage Center, refers to a large site on land owned by Mr. Carpenter and hence, apparently, Carpenter Ruin. His description of a large rubble mound situated north of a large midden in a location south of the county road match the size, configuration and location of the Wallace Ruin great house and midden. He does not mention the small habitation nearby.

When Project Archaeologist Bruce Bradley commenced formal archaeological excavations in 1969, Chappell's personal attribution for this site was not yet in the public domain. Bradley registered the site as Wallace Ruin, in reference to Walter Wallace, the new landowner. The great house and its large extramural midden, a possible reservoir, and a small Pueblo II domicile some 60 metres west of the great house are all components of 5MT6970, the assigned OAHP site number. Confusingly, this small farmstead was identified as Carpenter Ruin, Site 5MT696 when the Anasazi Heritage Center accessioned the Chappell Collection in 1983. That process involved the correlation of donated artefacts with location information recorded in Chappell's diaries. However, this attribution is inconsistent with Chappell's site description. Unfortunately, Bradley was not notified of this change in the OAHP records. Excavation research at the small site by the University of Wyoming Field School in 1991 did not include an OAHP records search, which would have provided notice that this domicile had been recorded and named separately. Instead, the University of Wyoming archaeologists used the name Green Stone Pueblo in their report to Bradley. This is the identification used in Figure 1.1 of B. Bradley's 2010 Annual Report to the State of Colorado and in this thesis. In terms of the two buildings located within Site 5MT6970, the term Wallace Ruin is synonymous with the great house in Bradley's publications and in works by numerous scholars.

Since 1969, intermittent research excavations and analysis have been under the sole supervision of principal investigator Bruce Bradley, with this researcher's assistance since 1974. Nnumerous volunteers have participated in Wallace Ruin projects, though the contributions of Tom and Terri Hoff are especially worth mentioning. From inception through current practice, Bradley's (1974:63) approach emphasised small-scale, long-term excavation and analysis. The information used in this thesis is derived from field records and publications prepared by Bradley (1974; 1988; 1993a; 2010a,b). The maps created by this author are based upon field maps generated by Bradley or this researcher, and recently revised, unpublished maps prepared by Bradley. The 1989 artist's reconstruction of the expanded great house by W. "Pete" Peterson was modified by Bradley in 2015 to provide a more accurate representation of the building based on subsequent research.

There is no published monograph on this site or a focused analysis of its mortuary evidence to date. B. Bradley includes brief summaries of human skeletal remains and their deposition contexts in his published progress reports (1974; 1988) and in several unpublished annual reports (1993b; 2010a,b) for the State of Colorado. The 1998 annual report was co-authored by this researcher, who supplied demographic assessments regarding human remains for all but the 1974 publication. Bradley (1996) references initial assessments in his proposition regarding a Pueblo III cultural revitalisation movement within the American Southwest. He (2010a:7) advises that numerous researchers have used information and material from Wallace Ruin for their own research projects and for advanced degrees. In terms of bioarchaeological studies, these consist of Malville's studies on dental enamel hypoplasia (1997) and stature (2008) in Ancestral Pueblo populations, Ortman's (2010) evaluation of the foundations of conceptual metaphor in the prehistoric Mesa Verde region, and Shelley's (1993) analysis of faunal materials from Wallace Ruin.

4.2.2 CHRONOLOGY

The excavated sections of the great house are reliably dated using dendrochronology, ceramic seriation and masonry style. Although some dates have been refined through the years, B. Bradley (1988; 2010) identifies five building construction phases between AD 1040 and the AD 1270s, at the latest. Figure 4.1 provides a visual summary of these phases by date, masonry style and associated diagnostic artefacts. Phases 1 through 3 are primarily dated by numerous tree-ring samples, processed by the Laboratory of Tree-ring Research, University of Arizona. Phases 3a and 4 are dated by ceramic seriation and kiva architectural attributes. B. Bradley describes the ceramic typologies employed in his 1988 interim report. The prevalent types consist of Mesa Verde region white wares and grey wares as described by Breternitz and co-authors (1974).

4.2.3 LAYOUT AND USE HISTORY

The building's floor plan was established during the mid-eleventh through mid-twelfth centuries, fully within the Pueblo II period and coincident with the duration of the Chaco Phenomenon (AD 1040s-1150). Pete Peterson's artist's reconstructions of the major construction periods in Figure 4.2 are accompanied by a plan map that identifies each of the excavated structures by building phase. Superimposed rooms sharing walls erected to a multiple-storey height are termed a structure as are kivas or single-storey rooms. Construction commenced in the 1040s, with the erection of a medium-sized, multi-storey masonry building (Fig. 4.2a). Its two and three-storey profile would have been exceptional compared to the neighbouring single-storey and largely *jacal* (stick and mud) residences.

Phases 1 and 2 pertain to this early, or founding, great house. For clarity's sake, this building is referred to herein as "Old Wallace" whereas the enlarged building that eventually encompassed it is called Wallace Ruin. The only Phase 2 event involved the addition of a north and west wall that bridged the space between the north and west wings. Five structures within the founding great house are completely excavated. In each case, ground storey rooms were completely filled with constructional debris during the Pueblo II occupation, or in the case of Rooms 2a and 2b, used as an intra-mural midden. The large majority of the architectural units were built during Phase 3, when the great house was much enlarged during a single episode in the 1120s, followed by the addition of a few more rooms in the 1140s (3a). Exposed architectural features, such as the masonry style of the exterior wall, in the unexcavated central room block and east wing are consistent with those observed in the western rooms. An act of vandalism exposed Chacoan architectural attributes in the large Pueblo II kiva situated within the eastern central block.

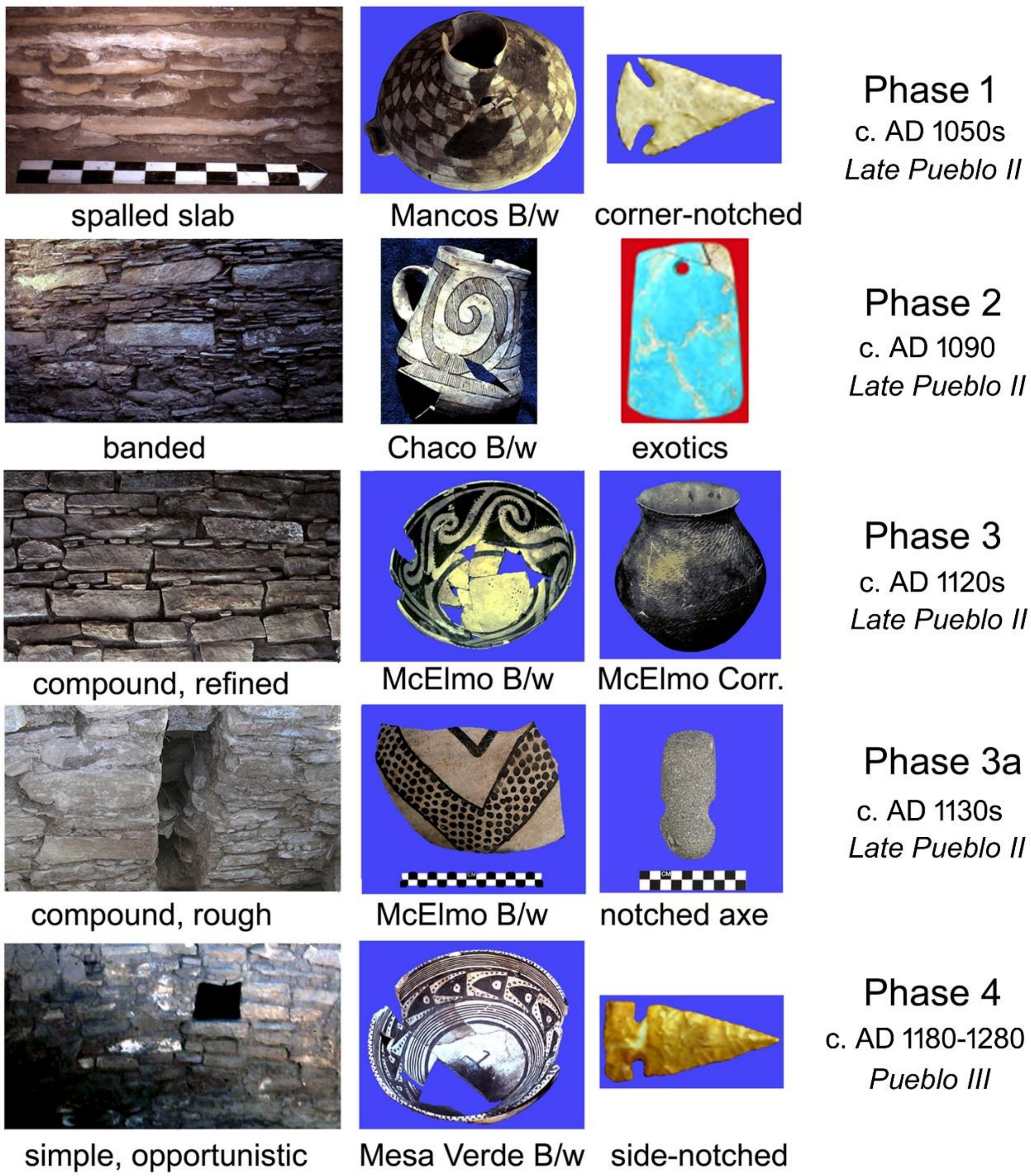


Fig. 4.1: Chronology of the Wallace Ruin construction phases. Dates are derived from dendrochronology or ceramic seriation.

Green Stone Pueblo was probably abandoned in the late 1000s, then the great house by about 1150, with no evidence of use for at least several decades. Associated Mesa Verde Black-on-white sherds indicate that sometime after AD 1180 a kiva was inserted into Rooms 14b and 15b, Phase 1 upper-storey rooms situated within the west wing of Old Wallace. Concurrent with this, upper-storey Rooms 24b and 25b of the central section of Old Wallace were remodelled as Kivas 3 and 4. Architectural attributes of these three Phase 4 structures are consistent with those of well-dated Mesa Verde phase, Pueblo III kivas.

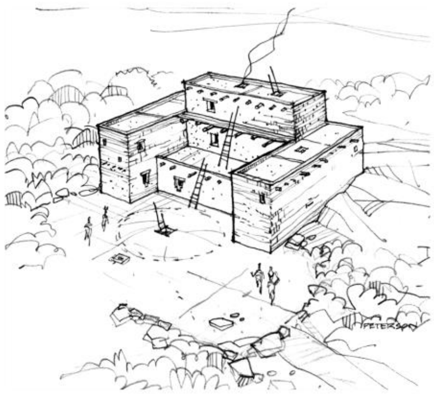
4.2.4 WEST ARM

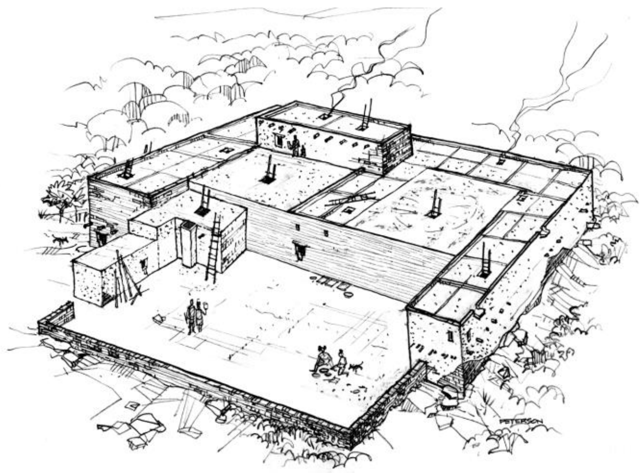
Research excavation has focused upon the proveniences identified in Figure 4.2 below. These consist of the West Arm of the enlarged great house, two structures within its central core, and limited testing of the large extramural midden. As of 2015, this section of the building is excavated entirely. These study units comprise 16 multi-storey structures (32 rooms), two one-storey structures, and one inserted kiva. Bradley (1988; 2010) argues the bulk of these rooms were constructed during a single episode, according to a planned and consistent sequence regarding outer walls, inner walls, ceilings, roofs, and floors.

Two clusters of interlinking rooms, or suites, are located at each end of the West Arm proper. These are referred to as the North Suite and South Suite, whereas the 1130s extension is termed the Annex. Detailed information on these sub-sections have not been compiled or published, apart from Bradley's 2010b report to the State of Colorado. Consequently, the stratigraphic and temporal allocations for all human remains within the great house were identified through a re-assessment of field documents and drawing upon Bradley's notes and preliminary findings. It is now evident that during the Pueblo III Period no rooms were added and also that remodelling was minimal, largely limited to room entrances. Visual inspection indicates, almost certainly, that the East Wing has no significant additions.

Ceramic evidence recovered from the limited test excavation of the large extramural midden some ten meters south of the great house (Bradley, 1993), and observed during years of informal reconnaissance of its surface, date to the Pueblo II occupation. Given the confusion regarding site designations, in 2010 AHC Supervisory Museum Curator Carolyn Landes (pers. comm) determined that the Chappell Collection includes one gourd dipper, another dipper, a bowl, a pitcher, assorted sherds and several small artefacts from the large 5MT6970 midden; all materials with diagnostic attributes date to the Pueblo II Period. Given their intact conditions and provenance, the reasonable assumption is that these came from mortuary contexts disturbed by Chappell.

In contrast, several intramural deposits comprise Mesa Verde phase artefact assemblages consistent with ritual discard. Bruce Bradley (1996:250) thus infers that the great house was occupied only intermittently for ceremonial occasions and as a mortuary facility during the Pueblo III Period, rather than as a permanent residence. Shelley (1993) draws the same conclusion from his analysis of faunal evidence. The end date for this second use of Wallace Ruin is unknown; it may have preceded or coincided with the Ancestral Pueblo abandonment of the Northern San Juan Region in the late AD 1200s.





"Old Wallace"

4.2a) *Founding Chacoan great house*

Construction Phases I & II

c. AD 1040s
early Pueblo II

Wallace Ruin

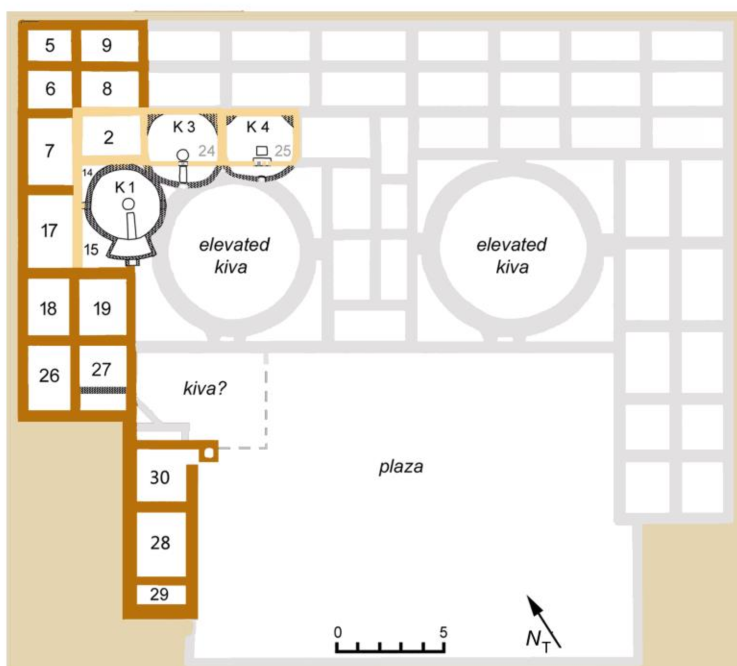
4.2b) *Expanded Chacoan great house*

Construction Phase: III

c. AD 1120s, 1140s
late Pueblo II

4.2c) Construction Phase: IV

c. AD 1180-1280
Pueblo III



Phases I & II, excavated
Phase III, excavated
Phase III, unexcavated
Phase IV, excavated
N structure number
K kiva

Fig. 4.2: Artist's reconstructions and schematic plan map of the Wallace Ruin great house. Reconstructions by W. "Pete" Peterson, 1989 (4.2b modified by B. Bradley, 2015); plan map based on unpublished draft by B. Bradley, 2012.

4.3. Comparative Materials

4.3.1 IDA JEAN PUEBLO (5MT4126): LAKEVIEW GROUP

The multi-storied, masonry structure of Ida Jean Pueblo is one of the four Chacoan great houses of the Lakeview Group. This monumental building, now extensively damaged by non-professional “pot collectors”, had a layout similar to Wallace Ruin. Between 1979 and the mid-1980s, archaeologist Joel Brisbin (Brisbin and Brisbin, n.d.) fully excavated four of its 35 or so ground-storey rooms, four work areas on the western side of the room block (counted here as surface rooms), a kiva, and the lower courtyard. Several tree-ring samples from the kiva provide cutting dates at AD 1124. There are no indications of structure remodelling or permanent occupation during Pueblo III times.

Ida Jean has nine Pueblo II primary burials and at least one Pueblo III primary burial. Brief descriptions of the mortuary and skeletal evidence are provided in the unpublished student papers and on notes recorded on the backs of photographs curated at the Anasazi Heritage Center. Charlotte Brisbin conducted a basic analysis of the skeletal remains. Neither of the Brisbins had formal training in osteological analyses, although the close correlation of their descriptions to photographic evidence and maps provides confidence in the accuracy of their interpretations; these documents are not available for publication.

4.3.2 HAYNIE RUINS (5MT1904/1905): LAKEVIEW GROUP

No formal research excavation efforts have been undertaken at either multi-storey building at Haynie Ruins of the Lakeview Group. Little remains of either structure, which are situated on private land. Haynie West was removed completely and Haynie East was heavily damaged by non-professional “pot collecting” efforts in the 1980s that entailed the use of heavy machinery. However, in recent years, landowner Ralph Haynie gave archaeologist Susan Ryan permission to obtain tree-ring dates from five intramural kivas at Haynie East for her doctoral research on architectural evidence for communities of practice. Several cutting dates indicate construction dates at about AD 1110-1120 (Ryan, 2013:669). With a subsequent change in land ownership, Ryan will commence formal research efforts in 2017 as part of the Northern Chaco Outliers Project sponsored by Crow Canyon Archaeological Center. There is a possibility that Pueblo II and Pueblo III primary burials were present at both buildings. However, mortuary evidence from this site is particularly problematic. None of the participants had a background in archaeological methods, records keeping or training regarding human remains. More troubling, the expressed excavation intent was commercial: to mine the site for Ancestral Pueblo vessels, including those from mortuary contexts. Thus, both in consideration of professional ethics and concerns about the credibility of information purportedly obtained, this study did not include assessments of Haynie Ruins mortuary contexts.

4.3.3 OTHER COMPARATIVE DATA SETS

The Mortuary Trends Database developed to meet Objective 2 is a significant product of this investigation as its scope far exceeds that used in Karhu’s (2000) or Stodder’s (1987) comparative analyses of Ancestral Pueblo mortuary patterns. Schlanger’s (1992) assessment is most similar but, unfortunately, that study is unpublished. Table 4.1 summarises variable counts for the three major San Juan Region study areas: Mesa Verde Region, Middle San Juan Region, and the Chaco Canyon Locality. Site types are segregated by great house or domicile, even though great houses also contained a residential component.

Table 4.1: Tallies of assessed San Juan Region locales and primary burials.

	MVR	MSJR	CCL	Total
Sites	101	17	5	123
Great houses	6	6	5	17
Domiciles	168	31		199
Primary Burials	532	554	120	1206

MVR Mesa Verde Region; MSJR Middle San Juan Region; CCL Chaco Canyon Locality

4.3.3.1 *Great houses*

In addition to Wallace Ruin, the great house data set consists of 17 actual or potential Chacoan great houses suitable for evaluation of primary burial deposit occurrence in either Pueblo II or III times. In addition to Wallace Ruin, MVR great houses include

Ida Jean Pueblo (Brisbin and Brisbin, n.d.), Mitchell Springs Pueblo A (Dove; 2014; Dove et al., 1997; Wheeler Smith, 2009b) Escalante Ruin (Hallasi,1979), Far View House (Fewkes, 1916), Lowry Ruin (Martin, 1936) and Albert Porter Pueblo (Ryan, 2004). The six MSRJ great houses consist of Aztec Ruin West (Morris, 1924), Salmon Ruin (Reed, 2006; 2008a), and the two great houses at both Morris 39 and Morris 41 (Morris, 1939). The five CCL great houses consist of Pueblo Bonito (Judd, 1954; Pepper, 1909; 1920), Pueblo del Arroyo (Judd, 1959); Pueblo Alto (Windes, 1987), and Chetro Ketl and Kin Kletso (Chaco Research Archive, 2016). All but Pueblo Alto are substantially to completely excavated. In contrast to MVR great house sites, the data from Salmon Ruin, Aztec West, and Pueblo Bonito are robust.

4.3.3.2 *Domiciles*

Mesa Verde region mortuary information comes primarily from unit pueblos, or domiciles, versus its scant data from Chacoan or potential Chacoan great houses. In contrast, data from the MSJR and Chaco Canyon Locality study units primarily involve great houses. Though all but a few of the MSJR domiciles are near an excavated great house, the MSJR data set also includes La Plata Valley residential sites evidencing no perceptible Chacoan connection. The sources used for domicile sites with a primary burial deposit are provided in Chapter 7 tables and Appendix D. In terms of mortuary location evidence associated with domiciles, MVR residential sites receive the most intensive analysis of the three archaeological districts. This is largely due to the assumption that the Wallace Ruin deceased were former inhabitants of one or more of its communities. In addition, archaeologists have conducted extensive research on MVR residential sites compared to such efforts within the MSJR or Chaco Canyon. Morris (1939) excavated multiple room blocks at Morris Site 41, which also has two small great houses, but his efforts did not extend into extramural areas, apart from a few test trenches in some residential middens. As a result, the information available from MVR research enables a more comprehensive look at the mortuary location choices observed. This interrogation also includes negative evidence of the mortuary use of roomblocks from the Supplemental Domiciles listed in Table 4.2 below. Among these are Green Stone Pueblo, the 5MT6970 unit pueblo near Wallace Ruin.

Table 4.2: Supplemental Domiciles, for which there are no reported primary burials.

Pueblo II		*Pueblo III*	
5MT10206	Errickson, 1993		
5MT, Site 2	Martin, 1938	5MT11338	Kuckelman, 1999b
5MT11787	Kendrick & Judge, 2000	5MT13510	Luebben, 1985
5MT13510	Luebben, 1985	5MT3901	Huber, 1989
5MT1786	Kent, 1991; n.d.	5MT5152	Kuckelman, 1999a
5MT2149	Hallasi, 1979	5MT9430	Luebben, 1985
5MT3876	Morris et al., 1993	5MT9948	Lindeman & Merewether, 2005
5MT3892	Fetterman et al., 1993	5MTUMR, #3	Reed, 1944
5MT5152	Kuckelman, 1999a	5MTUMR, #4	Reed, 1944
5MT5498	Fetterman, n.d.	5MV615	Fiero & Nusbaum, 1998
*5MT6970**	Reher, 1993		
5MT8653	Hungerford et al., 2002a		
5MT8934	Barnett, 1992		
5MT8937	Errickson, 1993		
5MT9873	Hampson et al., 2002		
5MT9948	Lindeman & Merewether, 2005		

* Green Stone Pueblo

4.3.3.2 *Evidence Summary*

Although evidence representation by great houses and domiciles varies between archaeological districts, both major temporal periods are well-represented by primary burials, per Ancestral Pueblo norms, except for Pueblo III depositions at Chaco Canyon great houses. Based on associated McElmo B/w pottery, the likelihood is that all or most of the Chaco Canyon individuals classed as Transitional PII/III are from mortuary contexts dating to the AD 1100-1175 interval (Akins, 1986). Assuming so, these individuals pre-date the mortuary use of Wallace Ruin at AD 1180, at the earliest. Several SJR sites are multi-component, but the salient factor involves the reliable allocation of a primary burial to either the Pueblo II or III Period. The ways in which these materials are used to advance the interpretive needs for research objectives 3, 4 and 5 are specified in the two chapters that follow.

CHAPTER 5

BIOARCHAEOLOGICAL METHODS

5.1 Introduction

This chapter concerns the skeletal methods used to acquire the two fundamental data sets that provide the empirical evidence needed to achieve interpretive Research Objectives 3, 4 and 5. To review, the achievement of Objective 1 entails the analysis and contextualisation of Wallace Ruin skeletal evidence that is presented in the next chapter. Accordingly, this researcher obtained primary data through a comprehensive osteological analysis of the skeletal assemblage in accordance with the criteria set forth in *Standards for Data Collection for Human Skeletal Remains* (Buikstra and Ubelaker, 1994), or *Standards*. In addition, all skeletal elements were situated within their spatial and temporal contexts through the retrospective analysis of primary documents generated during field research, with additional reference to Bruce Bradley's preliminary maps and explanations of stratigraphic interpretations.

Only skeletal and archaeological evidence deemed as providing interpretive value to this study were used to address the needs of Objective 2, which entails the acquisition of comparable data sets from SJR sites. The relevant skeletal indicators consist of skeletal damage and the paleodemographic variables of age, sex and population size. As above, archaeological data sets comprise spatial and temporal evidence. This effort also involved retrospective analysis of skeletal displacement evidence from field photographs, when possible. In addition, primary documents generated by Pepper (1896a-c) regarding his work in Room 33 of Pueblo Bonito, curated at the American Museum of Natural History but available online through the Chaco Research Archive, were reviewed.

Although skeletal and archaeological data are integrated in the bioarchaeological research approach used in this study, for clarity's sake this chapter subdivides descriptions of the methods used by information type. Section 5.2 focuses upon biological evidence whereas Section 5.3 addresses the methods used to contextualise these materials in terms of spatial and temporal contexts. The latter also describes the processes used to develop the Mortuary Trends Database, which correlates these lines of evidence by primary burial deposit. Section 5.4 concludes this chapter with a discussion of the statistical methods used to establish the reliability of findings for skeletal and spatial evidence.

5.2 Skeletal Analyses

5.2.1 SCORING METHODS

5.2.1.1 *Qualitative Assessments*

Although *Standards* criteria form the foundation of the skeletal appraisals, the manual does not uniformly advise whether a given technique involves gross visual inspection (naked eye) or slight (10x) magnification. For this study, all field and laboratory analyses were performed by gross inspection, with slight magnification used to identify incipient reactions and defects, and for more intensive evaluations of anomalies. Digital photographs of skeletal anomalies were taken at a high resolution as a further analytical aid.

5.2.1.2 *Quantitative Assessments*

At a minimum, each osseous element was measured in accordance with *Standards* guidelines, but its Standard Osteological Database forms were modified to include measurements of elements from both sides. When the constraints of *in situ* analyses prevented the lifting of bones, close approximations were obtained and recorded as such. Because of the need to perform isometric pair-matching of the disturbed remains, nontraditional measurements, such as those specified by Byrd (2008), were taken on incomplete elements. Byrd does not provide measurements for immature skeletal remains. Therefore, the measurement landmarks for infants less than one year of age that are provided in Figure 21 of *Standards* were applied for all immature bones, regardless of age group, simply for the purpose of osteometric sorting. The quantitative method used to determine limb angles is described in the Range of Motion section below.

5.2.2 SKELETAL INDICATORS OF PALEODEMOGRAPHY

5.2.2.1 *Estimation of Age*

A multiple-indicator approach was used whenever possible. *Standards* guidelines regarding age-related changes in the pelvic bones, dental wear, and vertebrae were used to evaluate mature skeletal remains, supplemented by the Krogman and Isçan (1986) technique for sternal rib ends. Every tooth crown and root was assessed in terms of formation stage using the criteria of Moorees, Fanning and Hunt (1963a; b), as compiled in Figure 23 of *Standards*. However, Ubelaker's (1989:Fig.71) chart for a Native American tooth formation and eruption sequence served as the primary basis for age estimation of juveniles. Subadult osseous development was appraised using information in Scheuer and Black (2004) and Baker and others (2005) regarding the appearance of primary and secondary ossification centers as well as epiphyseal union; these epiphyseal development assessments also played a crucial role in the re-association of displaced bones (Schaefer, 2008). For comparative purposes, *Standards* Age categories of Infant (0-3 years), Child (4-12 years), Adolescent (13-20 years), Young Adult (21-35 years), Middle Adult (36-50 years) and Older Adult (50+ years) are employed. These groupings are in line with Lewis's (2007: 59) advisory that broad age-at-death categories should be used in intra-group analyses to compensate for the margin of error inherent in ageing techniques; they also correspond to the categories used in recent Ancestral Pueblo bioarchaeological research.

5.2.2.2 *Determination of Sex*

Each of the morphognostic cranial and pelvic criteria detailed in *Standards* was used for determinations of sex, although pelvic data received greatest emphasis. Integral to a multi-indicator approach, metrical analyses included the well-established techniques described in Bass (2005) as well as Murail and other's (2005) recently developed Probablistic Sex Diagnosis (DSP) osteometric technique for evaluating the *os coxae,* a highly accurate tool even for incomplete bones. No attempt was made to assess an individual younger than about 15 years of age since there are currently no accepted criteria regarding sex determination of children's skeletal remains (Scheuer and Black, 2004:20; Baker et al., 2005:10; Lewis, 2007:47-54). However, pubis length mirrors adult sexual dimorphism by the mid-teens even if linear growth is not yet achieved (Lewis, 2007:53). Therefore, each pelvic and cranial indicator employed to sex adults was applied to those older adolescent skeletons in which, together, dental and epiphyseal development criteria indicated an age range of 15-20 years.

5.2.2.3 *Estimation of Population Size*

Identification of MNI, the minimum number of individuals represented by skeletal elements from a given assemblage, is the standard method for population estimation of archaeological populations (Adams and Konigsberg, 2004:138). The most common method, Max (L, R), simply entails counts of a given skeletal element per side (Ibid.), although major age group (adult vs subadult) distinctions are sometimes considered (Brickley and McKinley, 2004:14). However, the MNI calculation underestimates the death population unless it can be demonstrated that the number of individuals from an assemblage is known and that 100% of each element is present for every individual (Adams and Konigsberg, 2008:242), both being unlikely scenarios for archaeological assemblages. Moreover, it is impossible to evaluate the MNI in terms of analytic severity since the accuracy of the estimate must be evaluated in terms of the potential of recovering all members of the original population (Ibid., 2004:139).

In contrast, Adams and Konigsberg (2004; 2008:245) assert that their Most Likely Number of Individuals (MLNI) calculation is unaffected by data loss characteristic of archaeological assemblages and that, consequently, knowledge of the actual number of individuals present in a skeletal assemblage is unnecessary. They further emphasise that an additional benefit over MNI determinations is that it provides an estimate of the original death population rather than a count of individuals from a recovered assemblage (Ibid., 2004:138). Since this recent method is less well-known in bioarchaeological research, additional details regarding its derivation and calculation merit discussion.

In sum, the MLNI calculation is a refinement of the Lincoln Index method (LI) that zoologists and zooarchaeologists have utilised for well over a century (Adams and Konigsberg, 2004:139). The formula $\tilde{N}=n_1 n_2/m$, was derived for use in population studies involving the capture-recapture counts of living animals, then subsequently adapted for use in zooarchaeological research (Ibid., 2008:245): in this formula, Ñ refers to the estimated population size, n_1 stands for the number of animals captured in the first count, n_2 is the number of animals captured in the second count, and *m* is the number of tagged animals recaptured in the second count. For purposes of skeletal analysis, the underlying assumption is that bones from one side, (L), are analogous to n_1; bones from the other side, (R), represent n_2; and matched pairs, or antimeres, (P), are analogous to recaptured animals, (*m*). Thus, the revised formula for skeletal remains is *LI=LR/P*. The key theoretical premise of the LI is that that the proportion of the animals originally caught, tagged, released and then recaptured in the second count will approximate the frequency of animals in an entire living population of unknown number.

Concerned that the Lincoln Index method did not allow a researcher to account for taphonomic sample bias in small sample sizes, Chapman (1951) proposed the formula in which N* represents the living population size:

$$N^* = \left[\frac{(L+1)(R+1)}{P+1}\right] - 1$$

Subsequent analyses have shown that this formula will entail only trivial bias as long as there are at least seven pairs and that it achieves 95% accuracy when five pairs are present (Adams and Koningsberg, 2004:141-142). In their assessment of this revised index, Adams and Konigsberg determined that Chapman's formula, which they restate as the Most Likely Number of Individuals (MLNI), represents the estimate of the maximum number of individuals in the original death population and thus provides a more realistic figure for demographic analyses (Ibid., 2004:149). In addition, they also show how this formula can be evaluated in terms of confidence level (Ibid., 2008: 246). However, these researchers caution that this precision will be affected considerably if bones have been removed from the sample in a non-random fashion or, because of the formula's multiplicative properties, count error will be magnified if bone pair matches are inaccurate. They therefore recommend that this method is not suitable for bone assemblages that are poorly preserved or highly fragmented (Ibid., 2008:247).

Although many Wallace Ruin bones are damaged, the condition of the assemblage is suitable for MLNI determinations (see Table E.5). Accordingly, both MNI and MNLI and were calculated following comprehensive skeletal re-association efforts. These attempts primarily served to identify homologues but they also enabled the segregation of Individual Links (iLinks) represented by cranial and infra-cranial elements comprised of homologues and contiguous articulating elements. The initial phase involved the refitting of broken bones, then pair-matching of anatomic units classed as Links: these consist primarily of antimere Links, with some contiguous Links identified by matching articular surfaces, including those of the vertebral lamina. This was accomplished firstly and primarily through gross visual comparison of potential bones within the same room, taking into consideration such attributes as size, morphology, development, coloration, and condition. In cases when there was more than one option for a match, Byrd's (2008) method for isometric sorting, or segregation, was used to eliminate all but the most likely bone. For a burial still missing skeletal elements after all potential matches from the chamber were eliminated, bones from other rooms were then considered, beginning with those from rooms sharing a connecting doorway; this process continued until all Wallace Ruin bones had been eliminated from consideration. Likewise, each Isolate was evaluated using this same procedure, so that all Links were segregated regardless of provenience. No attempt was made to perform intermural matching of ribs or the bones of the hands and feet. Teeth separated from their dental sockets post-mortem were re-associated only within rooms; re-association consisted of determining the closeness of fit within a socket, morphological similarity to an antimere or occluding tooth, and also facet matching. Since there is a potential for segregation error in most matching efforts, re-associated teeth were not used for radiocarbon analyses.

Conclusive pair-match determinations are compromised by the canid-damage, especially regarding long bone ends. Accordingly, a fragmentary bone (<25% of an element) was excluded from pair-matching attempts unless it retained a distinctive morphological feature. Matches that were probable but not conclusive were classed as pairs to prevent over-estimation of the burial population. Following the re-association procedure, MNI and MLNI calculations were obtained, in which independent results using the four most common skeletal elements are averaged per temporal period using Konigsberg's (Adams and Konigsberg, 2004) companion interactive spreadsheet for multiple skeletal elements. Table 5.1 presents the example dataset he provided; unfortunately, the address retrieved in 2013 (http://konig.la.utk/edu/MLNI.html) is currently inactive.

Table 5.1: Konigsberg's[1] example interactive Excel spreadsheet for calculating the Minimum Number of Individuals (MNI) and the Most Likely Number of Individuals (MLNI), and probabilities, from multiple bones.

	Tibia	***Os Coxa***	***Humerus***	***Femur***	***Overall***
Left	**30**	**20**	**31**	**43**	**124**
Right	**34**	**19**	**37**	**36**	**126**
Pairs	**20**	**12**	**22**	**31**	**85**
MNI	**44**	**27**	**46**	**48**	**48**
MLNI	**50**	**31**	**51**	**49**	**49**
r	0.625	0.615385	0.647059	0.78481	0.68
s.e.[r]	0.070961	0.091668	0.067407	0.050968	0.033896

[1] Adams and Konigsberg, 2004.

5.2.3 TAPHONOMY

5.2.3.1 *Skeletal Indicators of Damage*

Using gross visual inspection, each skeletal element was appraised for evidence of fracturing, with such damage recorded by location, size, the percent of the element affected, fracture shape, and timing (ante-mortem, peri-mortem, or post-mortem) in line with protocols established in *Standards* (Buikstra and Ubelaker, 1994), Lovell (1997), Ortner (2003) and Villa and Mahieu (1991). As advocated by Outram and others (2005), each observation included a description of the specific fracture characteristics observed. Selected examples of Wallace Ruin fractures for each fundamental type are compiled in Figure 5.1; additional photographs are provided in Chapter 6 (Figs. 6.2, 6.16 and 6.17) and in Appendix C osteobiographies. A fracture that displayed evidence of healing was classed as an ante-mortem break, with documentation of the type of bony reaction (woven, lamellar, mixed, or cortical surface re-established, i.e. compact bone) and status of healing (active, partially healed, or healed). A determination of peri-mortem fracture required the presence of at least one fracture attribute that could result from the breakage of green bone;

cranial fractures had to display at least one of the following characteristics: depression into the diploë, an adhering flake, a radiating crack, internal vault release, or a beveled fracture edge. Long bones had to show depression into spongy bone or sharp-edged, longitudinal or spiral fractures. Those fractures that showed such damage as transverse breaks (with irregular edges) or other irregular edges were classed as post-mortem breaks.

Scavenger (animal) damage was detailed by location, percentage of the element affected, and type of damage: gnawing, tooth punctures, and tooth scoring or furrows. An intensive analysis of such damage was not performed. However, the segregation of carnivore damage from other skeletal trauma is based on tooth impression size and shape as compared to evidence from actualistic studies (Carson et al., 2000; Dominguez-Rodrigo and Piqueras, 2003). Finally, all elements were evaluated for weathering and burning, and scored by *Standards* guidelines, whereas ground erosion was scored in line with standards of the *British Association for Biological Anthropology and Osteoarchaeology* (Brickley and McKinley, 2004).

In this study of human remains in archaeological contexts, an element with "green" bone damage involving the extensive loss of a bone region from carnivore gnawing was interpreted as in Stage 4 owing to the probability that these areas still retained soft tissues or gummy by-products. However, multiple elements from the same individual were used for a determination of whether damage may have occurred in early Stage 5 skeletisation. Damage comprising isolated tooth marks or small areas of bone removal of green bone was interpreted as occurring in early Stage 5. All dry-bone fractures were classed as Stage 5 damage.

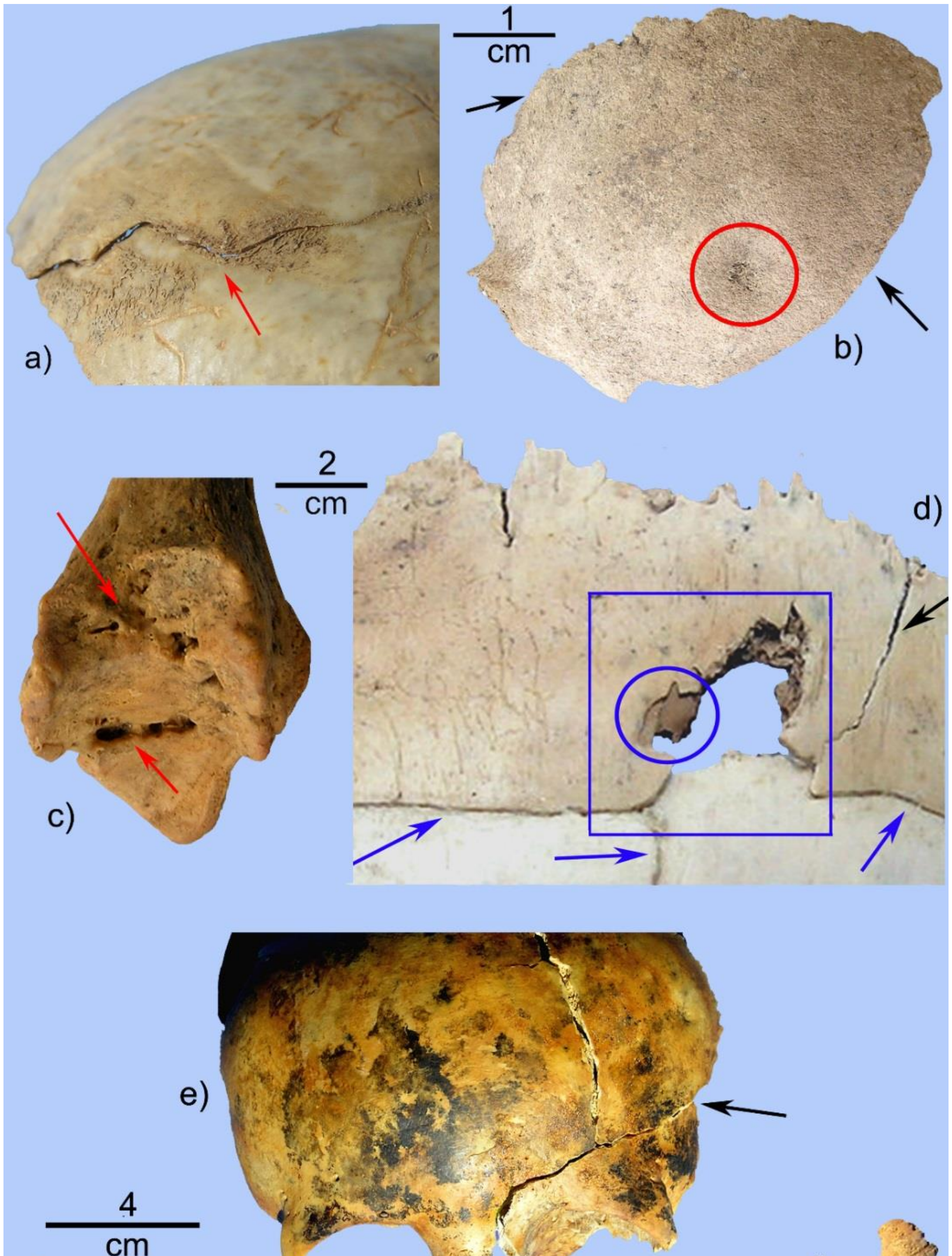


Fig. 5.1: Fracture types observed at Wallace Ruin. Red symbols indicate ante-mortem damage; blue signifies peri-mortem fractures; black indicates post-mortem damage. Fig. 5.1a) HR 9 occipital: linear fracture, woven bone, active healing; b) Cranial Link 145 anterior frontal: depression fracture, healed; c) HR 11 radius epiphysis: complete fracture, healed; d) Cranial Link 1845 right parietal: green-bone radiating fractures incurred prior to Stage 5 decomposition, originating from a carnivore tooth puncture (square) that is associated with an adhering flake (circle); the dry-bone fracture was incurred after re-deposit in Room 5a; e and f: HR 6, frontal and femur, typical dry-bone fractures.

5.2.4. TAPHONOMIC METHOD: CARNIVORE SCAVENGING

5.2.4.1 ***Corpse disarticulation sequence***

As applied in this study, the forensic notion of post-mortem interval (PMI) equates to the post-mortuary deposit interval. As summarised by Pokines and Tersigni-Tarrant (2013), numerous forensic anthropologists have tried to correlate PMI decomposition stages with patterns in carnivore scavenging. Their research constitutes retrospective studies (discovered bodies) of human remains, such as Haglund and co-authors**'** (1989) evaluation of 30 forensic cases from the US Northwest Coast, and actualistic studies involving carnivores and animal corpses (Lotan, 2000; Willey and Snyder, 1989). Lotan (2000:422) surmises that the disappearance of juvenile bones from young calves is partly attributable to the destruction and consumption of cartilaginous bones with low structural density. Both types of studies demonstrate that carcass reduction by carnivores follows a predictable sequence, and moreover, that stages of disarticulation correspond closely with stages of decomposition in the post-mortem interval. Haglund and colleagues (1989) identify four disarticulation intervals: Stage 0: no bony involvement; Stage 1: ventral thorax damaged and one or both extremities removed; Stage 2: lower extremity involvement; Stage 3: only vertebral segments remain articulated; and Stage 4: total disarticulation.

5.2.4.2 ***Skeletal indicators of disarticulation stage***

Determinations of the disarticulation interval for Wallace Ruin remains are based on the occurrence of articulated anatomic units (AAU) and element representation. An AAU must comprise at least two elements evidencing a persistent anatomic connection within a disordered skeletal context. Representativeness determinations per skeletal element are founded on the number of bones observed in an archaeological context versus the expected, anatomic, number relative to the Minimum Number of Individuals (Bello and Andrews, 2009:3). Skeletal representation determinations per age group are based on criteria described in Scheuer and Black (2004) and Baker and colleagues (2005). Examples of Stage 3 AAU (vertebral units and one foot) and Stage 4 (total disarticulation) classifications are observable in Figure 5.2.

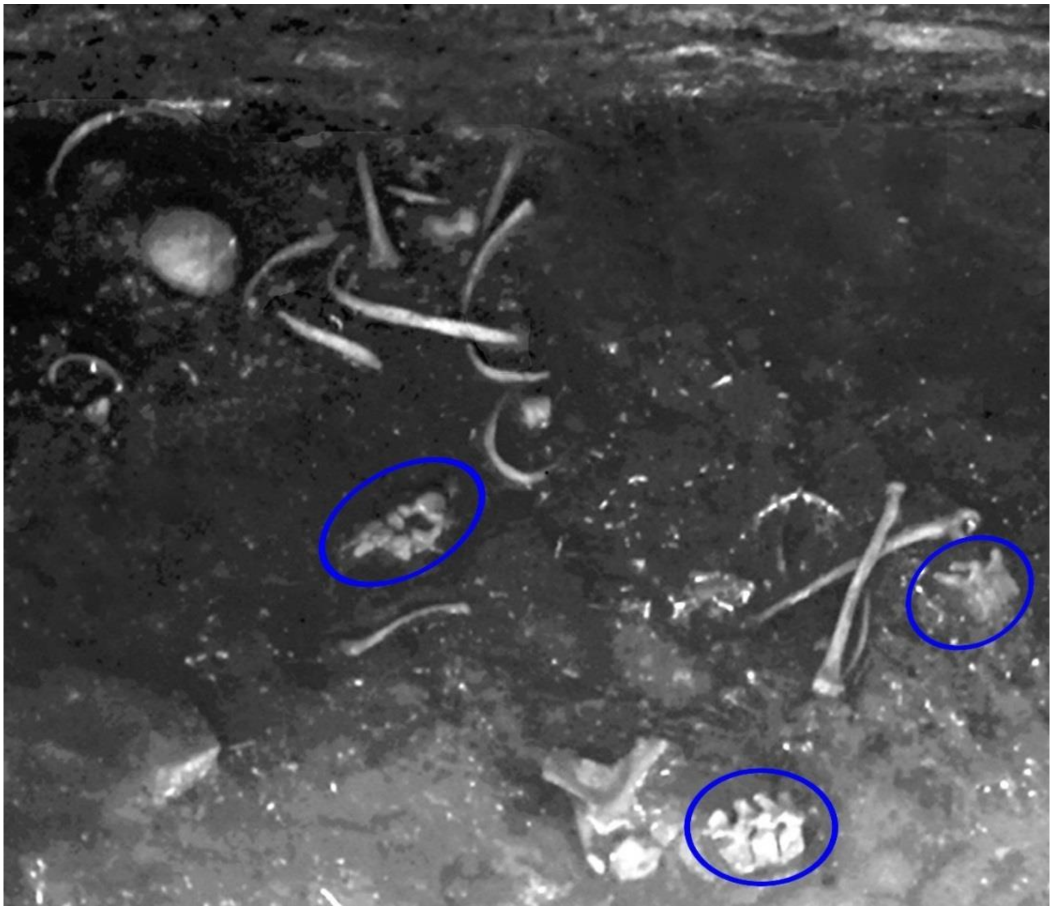


Fig. 5.2: Re-deposited commingled, carnivore-damaged bones and three articulated anatomic units (circled) on the floor of Room 5a of Wallace Ruin.

5.2.5 TAPHONOMIC METHOD: *ANTHROPOLOGIE DE TERRAIN*

The evaluation of anatomic relationships within skeletal remains relies upon the retrospective analysis of labile and persistent joints from *in situ* photographic evidence and field maps. Due to the problems of angle distortions and image quality, only bone displacements which are substantial or impossible in a living person are considered as of interpretive value. The terms and variables identified by Duday (2006; 2009) are defined below, whereas this researcher's method for assessing lower limb displacements by Range of Motion (ROM) is presented in Section 5.2.6. Images for the variables described in this section are compiled in Figure 5.3 whereas Section 5.2.6 also includes graphics concerning ROM lower limb displacements.

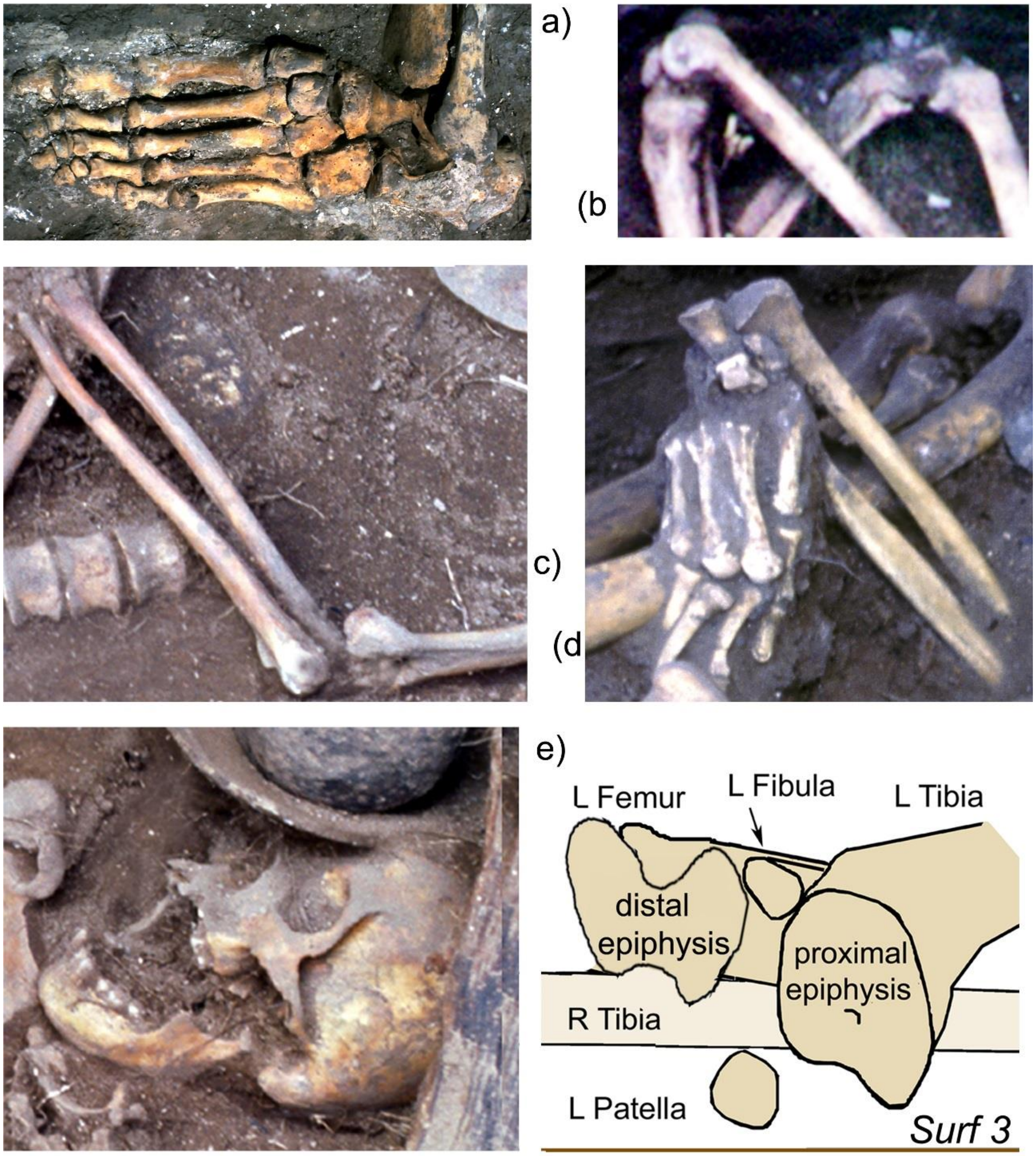


Fig.5.3: Wallace Ruin field photographs per anthropologie de terrain taphonomic classification: a) HR 4, left foot, intact labile connections; b) HR 13 and HR 14, knees, persistent connections; c) HR 10, left ulna, axial rotation; elbow, increased joint space; d) HR 4, right hand, extremity displacement; e) dropped element, left, HR 10 mandible and right, HR 6 patella (drafted map).

5.2.5.1 *Labile Connections*

All skeletons and articulated anatomic units are evaluated in terms of the presence of normal anatomical relationships pertaining to the joints of the hand bones, forefoot (metatarsals and phalanges), the scapula-thoracic junction and the femur-acetabulum joint (Duday and Guillon, 2006:121,127). According to Duday (2009:27), intact labile connections, as are exemplified by the left foot of HR 4 in Fig. 5.3, are essential to demonstrate the presence of a primary burial deposit.

5.2.5.2 *Persistent Connections*

All skeletons and anatomic units are appraised for the presence of normal anatomical relationships evidenced by articulations of the joints of the knees (Fig. 5.3b), ankles, tarsals, lumbar vertebrae, and the sacro-iliac joint. The occipital-atlanto (occipital condyles and C1) joint is also a persistent connection, but retrospective assessment of this anatomic relationship was possible for just HR 17.

5.2.5.3 *Axial Rotations, Upper Limb*

All upper limb bones are evaluated for internal or external rotation upon the axis beyond normal anatomic position, as determined in studies of living individuals (Soucie et al., 2010). However, all but slight ulnar rotation is diagnostic of a post-deposit displacement since such movements are not possible in a hinge joint. This is especially the case when a significant increase in joint space between the trochlear notch of the ulna and the olecranon fossa of the humerus is observable. Figure 5.3c documents both circumstances.

5.2.5.4 *Increased Joint Space*

Persistent joints evaluated for a noteworthy increase in joint space were those of the knee, elbow (Fig.5.3), ankle and sacro-iliac joint. Owing to the problems of retrospective analyses, minor increases of less than one centimetre in the joint space were, typically, excluded from consideration.

5.2.5.5 *Extremity Displacement*

Articulated hand (see Fig. 5.3d) and feet units are evaluated for abnormal anatomic position relative to the contiguous long bone, based on criteria developed *in vivo* studies for the hand (Eaton, 1997) and the foot (Bennell and colleagues (1999).

5.2.5.6 *Dropped Element*

An element was classed as dropped when in an elevation significantly below anatomic position. Patellae and mandibles receive particular attention (Fig.5.3e).

5.2.6 TAPHONOMIC METHOD: RANGE OF MOTION

Rather than the simple use of the broad, and often undefined, categories of flexed or semi-flexed (crouched) postural arrangements, Ubelaker (1989:14) recommends that each description of the relationship between two adjacent anatomic regions should include an estimate of the angle. Thus, in his Figure 17, Ubelaker reports the right leg as flexed on the thigh at an angle of 10°. However, though his method accurately describes observed skeletal configurations, it does not necessarily discriminate between a limb, or a subunit, in normal anatomic position versus one that has collapsed into a non-anatomic configuration during decomposition. Significant to this study, in contrast to the subtle skeletal displacements that can be caused by burrowing animals, compelling evidence for open mortuary microenvironments is provided by lower limbs that have collapsed from a depositional upright knees postural arrangement into their near-horizontal discovered positions.

The method used here to substantiate and quantify such a significant change in postural arrangement is based upon variance from anatomic Range of Motion (ROM) of the hips or knees. In this physiological "0-180" system, all anatomic positions begin at the 0-degrees neutral, or starting, position and the angle increases up to 180 degrees as a limb flexes; in contrast to standard anatomic position, the forearm is oriented midway between supination and pronation (Soucie et al., 2010). Though both methods measure angles within a 180° radius, in geometric terms Ubelaker's approach measures the internal angle whereas ROM measures the external angle. According to Sprague (2005:89), Martin and Akins (2001:228) provide the only bioarchaeological study that makes use of Ubelaker's descriptive system, and he could find none that utilised the ROM standards employed in medical research or physical therapy. This author's effort to identify assessments using either method in the decade since was also non-productive.

Therefore, the method developed used to conduct retrospective analyses of skeletal postural arrangement is adapted from standards developed in kinesiology studies. Knee and hip flexion ROM standards for adults (Pinskerova et al., 2009; Roass and Andersson, 1982) and subadults (Soucie et al., 2010) are similar. Primarily, the relationships most relevant to this analysis entail the observed configuration of the thigh (femur) relative to the torso (hips) and of the leg (tibia and fibula) in respect to the thigh. Additional information involves assessment of the ankle-tibia anatomic connection. Angles pertaining to the movement of the femur in respect to the ball-and-socket hip joint comprise hip flexion, adduction, abduction, internal rotation and external rotation. The hinge-joint of the knee is evaluated only in terms of flexion. Ankle movement is evaluated in terms of rotation (eversion and inversion) and flexion. An associated change in angle from a neutral position (0 degrees) can be determined for each variable independently. However, limb positioning in a configuration that involves flexure of the hip entails a combination of movements. In contrast, an extended lower limb can be abducted (lateral motion) without a change from neutral position relative to the frontal plane. The ROM and observation criteria used to segregate three fundamental postural arrangements are provided in Table 5.2. The points of reference used to apply ROM standards to skeletal remains are specified in Figure 5.4. These include multiple measurement points for abduction and adduction to account for observability needs.

5.2.6.1 *Abduction*

Abduction is the lateral movement of a limb, or away from mid-line. In a supine individual, abduction of the extended limb may not involve hip flexion as the heel scrapes outwardly across the underlying surface. Abduction with a flexed knee but no hip flexion is possible only when the leg projects posteriorly; this configuration cannot occur when the body is supine on a flat surface. An extended thigh (anterior presentation) can move laterally some 55°, but a fully flexed thigh (posterior presentation) can abduct move no more than 45°. Due to the complexities of retrospective analyses using photographic evidence, the greater trochanter-horizontal reference line (HRL) reference points may not be visible. However, calculations using the anterior superior iliac spine (ASIS) reference points involve the same ROM angles.

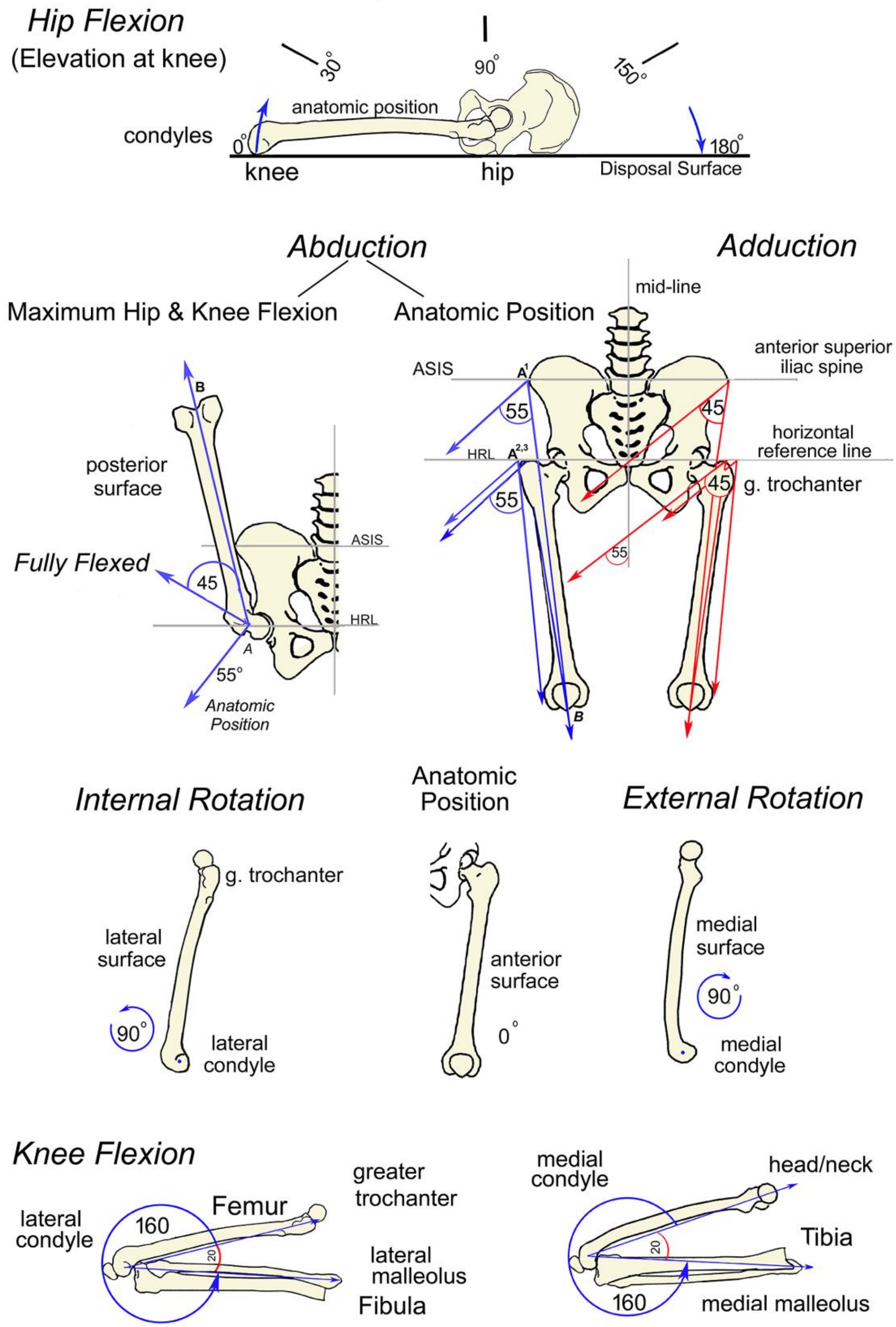


Fig. 5.4: Schematic diagrams of protocols for measurement of lower limb ROM in skeletal remains.

Table 5.2: Lower Limb Range of Motion (ROM) variables for a skeleton in which the torso is supine, by postural arrangement.

Postural arrangement	Anatomic unit relationships	ROM°	Bone surface presentation (from above)
Full Extension (neutral)	Thigh on Torso	0	anterior femur
	Leg on Thigh	0	anterior tibia and fibula
	Limb, External Rotation	≈ 90	medial surface, femur & tibia
	Limb, Internal Rotation	≈ 90	lateral surface, femur & fibula
	Ankle dorsiflexion	≈ 15-20	plantar-oblique
	Ankle plantarflexion	≈ 55	anterior
	Ankle, External Rotation	50	medial-oblique
	Ankle, Internal Rotation	50	lateral-oblique
	Foot position		calcaneus on deposit surface; maximum distance from pelvis
Upright Knees (Semi-Flexed)	Thigh on Torso	≈ 60-80	anterior femur; oblique condyles
	Leg on Thigh	≈ 135-	anterior tibia, fibula & patella
	Ankle, plantarflexion	≈ 30	foot dorsum
	Foot position		plantar surface in full contact with deposit surface; moderate distance
Full Flexion	Thigh on Torso	≈ 120-	posterior femur
	Leg on Thigh	≈ 160	anterior tibia & fibula; oblique patella
	Ankle dorsiflexion	≈ 40	plantar surface, oblique angle
	Ankle plantarflexion	≈ 55	foot dorsum
	Foot position		elevated above deposit surface; adjacent to inferior pelvis

5.2.6.2 *Adduction*

Adduction is the medial movement of the thigh towards and beyond mid-line, in a motion that requires hip flexion to allow passage of one limb over the other. As measured from the point where the greater trochanter meets the horizontal reference line, normal ROM is a maximum 45° regardless of whether the thigh is flexed or extended. Owing to the anatomic convergence of the distal femora at the knees, this angle is 55° when calculated using mid-line.

5.2.6.3 *Hip Flexion (Elevation of knee)*

Hip flexion entails the forward (anterior) movement of the thigh, which effectively decreases the space, or angle, between the torso and thigh. This movement results in a mean ROM of 120 degrees, though a maximum 150 degrees, at full flexure with the thigh held tightly against the torso. For a supine body, this measurement is effectively an indicator of the change in vertical position of the knee relative to the torso, and thus the underlying surface. Although skeletal remains cannot be measured for angle of hip flexion, the measurement of the angle between the femoral condyle, or distal diaphysis, and the disposal surface serves two purposes. Namely, in combination with other variables, it provides a means to establish whether the discovered vertical elevation of the knee (or distal femur) is within anatomic possibility; and, it serves as a proxy for evaluating whether the angle observed is sufficiently distinctive to indicate corpse decomposition in an open space. In a supine presentation, the only anatomic position in which the posterior surface of the distal condyles rest upon the same supporting surface as the torso involves a lower limb in extension. As depicted in Figure 5.5, in a living or recently deceased individual the anterior surface of the knee in a fully flexed thigh will be some 30°, and several centimetres, above the disposal surface. The extended, neutral position of the knee equates to 0 degrees; otherwise, a floor contact involving any limb flexion scores as 180°. For the purposes of this study, to maintain continuity between methods applied to supine versus lateral skeletal depositions, the lateral (medial for its antimere) surface of a condyle resting upon a deposit surface is considered to be in the neutral, anatomic position; accordingly, hip flexion (elevation of knee) is scored as 0 degrees, regardless of the angle between thigh and torso.

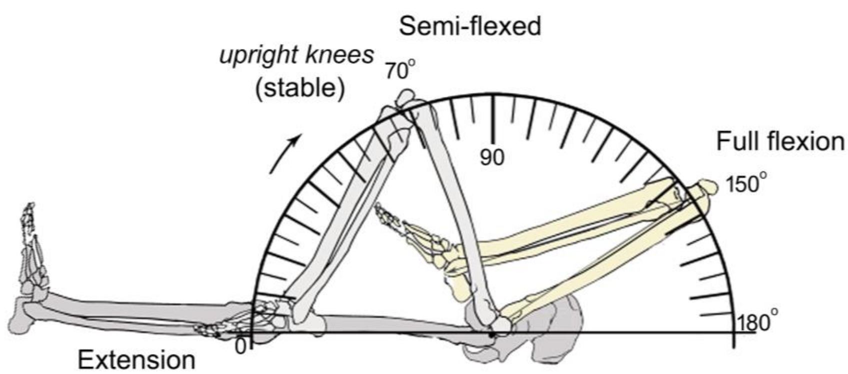


Fig. 5.5: Anatomic angles of the knee, from the extended, neutral position to full flexion.

5.2.6.4 *Rotation, External and Internal*

Rotation is the circular movement of the limb on its own axis. In terms of the femur, the maximum ROM for internal rotation is 55°and external rotation is a near equivalent of 50°. For a skeleton in the (anatomic) supine position, a femur in maximum external rotation will present the antero-medial surface. In contrast, a femur in maximum internal rotation presents the antero-lateral surface. In both cases, the relevant condyle will rest upon the surface at an oblique angle.

5.2.6.5 *Knee Flexion*

The hinge joint of the knee is stable, capable of moving only in flexion (posteriorly) or extension (anteriorly). Since the mean adult ROM of 145° is derived from a population that sits upon chairs rather than using a squatting position, this finding may not be representative of Ancestral Pueblo individuals. On the other hand, the maximum, or absolute, knee ROM of 160° for all humans was established in a study involving dissection of the knees of cadavers. As determined by Pinskerova and colleagues (2009), as the knee flexes beyond 120°, the posterior horn of the medial meniscus becomes compressed in the synovial recess so that the “medial meniscus impedes flexion at 140° and limits it absolutely at 160°.” However, their study does not take muscle mass dimension on the thigh and calf into account, which tends to limit flexion to the maximum 144° angle observed in living male adults (Roass and Andersson, 1982) as well as males and females 9 to 19 years of age (Soucie et al., 2010).

5.2.6.6 *Multi-variable postural arrangement*

Lower limb postural arrangements typically involve multiple variables. Extreme postural arrangements in which the lower limbs are in a squatting arrangement are common configurations in Yoga, including the supine “Reclining Bound Angle Pose” and “Goddess Pose”. In these configuration, the lower limbs of the supine individual are semi-flexed (~45°), with plantar surfaces of the feet in direct contact with each other and lateral surfaces resting upon the floor; the lumbar vertebrae are arched above the floor; significantly, femoral abduction and external rotation angles are at maximum extent. Yet, even when Yoga adepts adopt this configuration, the knees are elevated several centimetres above the floor surface. Also, although elite professional ballet dancers can achieve greater than average ER, it is still less than 60° (Gupta et al., 2004:Tab. 2). A key point is that there is no postural arrangement involving lower limb flexion in which the knees, or distal femur, will rest upon or just above the same surface as the supine torso of a fresh corpse. In other words, a hip flexion (elevation of knees) result of ~180° is equivalent to a dropped element. Such evidence represents a change in elevation that entails a significant displacement from normal anatomic position during decomposition. A possible exception could occur when the knees of tightly bound, fully flexed limbs drop into the void space of the decomposing abdominal cavity, to an elevation approaching floor level and regardless of micro-environment type. Otherwise, in contrast to the normal ROM results for abduction/adduction and rotation entailed in this skeletal configuration, the dropping of the knee (distal femur) onto the disposal surface will typically involve several non-anatomic measurements.

5.2.6.7 *Angle Measurement Protocols*

Since bioarchaeological evidence is not directly comparable to measurements taken on a living person, the maximum angle is used rather than the mean result. In living people, ROM is measured with a goniometer. Using Adobe Photoshop software, digitised images of compiled maps of *in situ* remains were overlain with transparent protractor templates created for each measurement variable, on which normal ROM angles are specified. Consistent with normal clinical practice (Roass and Andersson, 1982:206), angles were recorded to the nearest 5 degrees. However, since oblique camera angles and grainy photographs can present information that is misleading, only significant divergences (>15°) from normal ROM are construed as indicative of a post-depositional displacement of interpretive consequence.

5.2.7 BIOARCHAEOLOGICAL CORRELATES TO ROM

Ascertaining normal range of motion angles from photographs provided in archaeological publications is a crucial component of this thesis, owing to this researcher's interpretation that most of the suitable skeletons from Wallace were in this postural arrangement at deposition. Range of Motion angles that are standard to kinesiology studies are determined for the orientations of the lower limbs relative to the torso and the knee. The reliance on photograph evidence shot from an oblique angle and the complications of bioarchaeological evidence means that these results are not directly comparable to *in vivo* research. However, these sources of bias are insufficient to undermine conclusions drawn from these data. The criteria for normal ROM angles pertaining to various supine postural arrangements, which are applied to *in situ* photographs and maps of primary burials, are derived from medical resources. Yet, no Wallace skeleton was in such a postural arrangement at discovery. Thus, in the sections that follow, primary attention is given to archaeological evidence of this and two other postural arrangements involving supination and flexure. The point made here is that these evaluations do not involve detailed taphonomic analyses of all skeletal displacements. Rather, the focus is placed upon key attributes of lower limb arrangements that contribute to interpretations of corpse arrangement.

The schematic drawings compiled in Figure 5.6 display key attributes of four lower limb postural arrangements: lateral torso and semi-flexed limbs, and three supine skeletons with upright knees, fully flexed, and loosely flexed/ akimbo lower limbs. Angles are determined by overlaying a series of transparent ROM protractors upon published photographs of *in situ* Ancestral Pueblo burials available in the credited online resources. These depictions also identify midline and the horizontal reference line (HRL), the major anatomic references used to ascertain limb angles for ROM assessments. It is again emphasised that a hip flexion/elevation of knee angle of 180° is deterministic of a downward displacement during decomposition that exceeds anatomic possibility in a living person or a fresh corpse. The locations of the feet relative to the torso are also detailed owing to their interpretive importance in the identification of a specific postural arrangement, even when post-deposition displacements or disturbances alter the original configuration of the long bones.

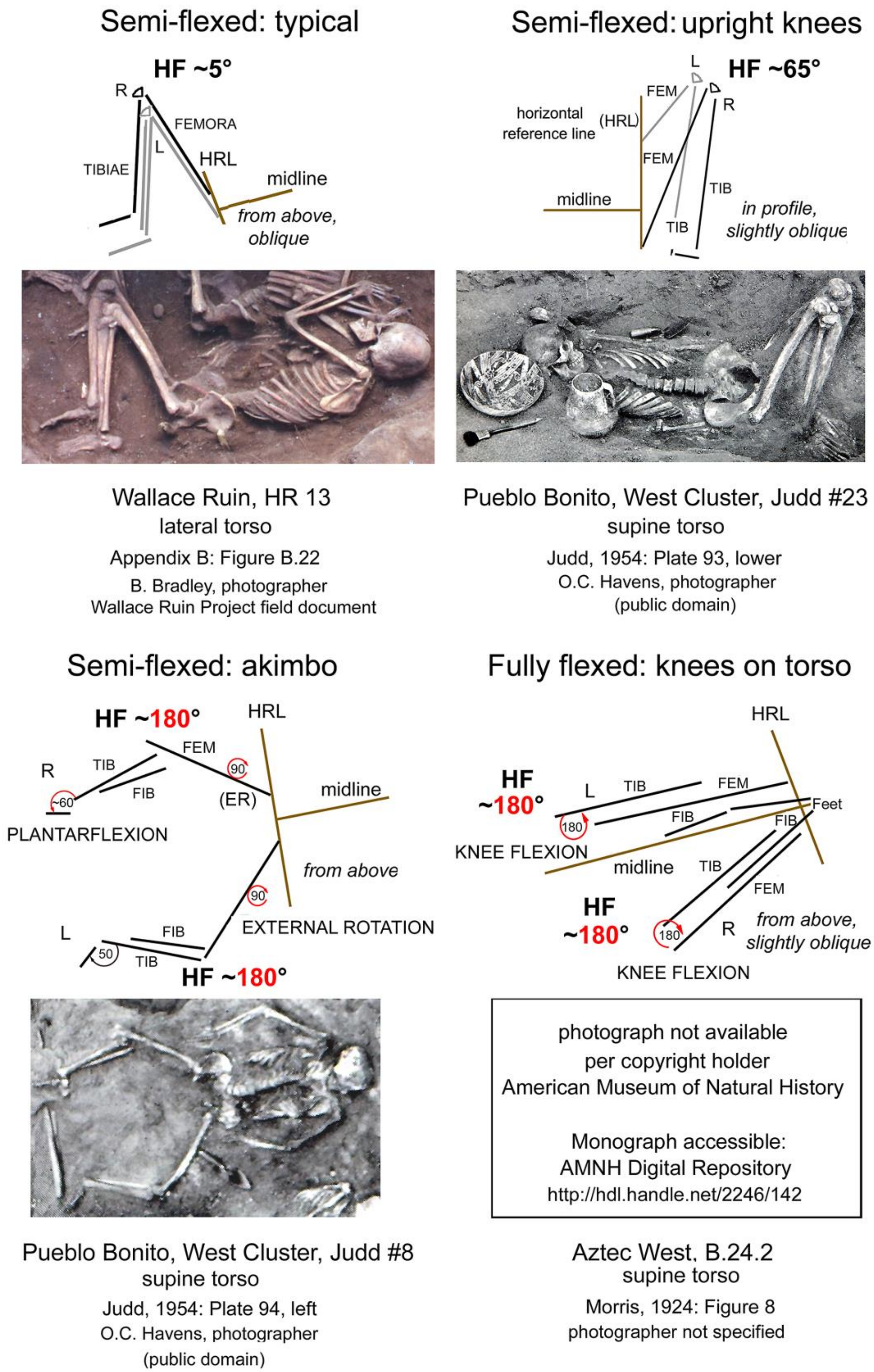


Fig. 5.6: Schematic representations and field photographs of four lower limb postural arrangements, highlighting (bold) the measured angles for Hip Flexion (HF), or Elevation of knees, relative to the disposal surface. Non-anatomic angles (red) comprise: Hip Flexion, Judd #8 and Aztec West B.24.2; External Rotation and Plantarflexion, Judd #8; Knee Flexion, Aztec West B.24.2.

5.2.7.1 *Upright Knees Postural Arrangement (USF/S)*

The most common MVR and MSJR postural arrangement entails deposit on a side (lateral presentation), with forearms folded across the abdomen or along one or both sides, lower limbs in some degree of flexure, and feet positioned within the vicinity of midline. As is shown in Figure 5.6, the semi-flexed lateral (SF/L) position of HR 13 of Wallace (upper left) and the upright knees postural arrangement of Burial 23 of Pueblo Bonito (upper right) are essentially equivalent except that the latter involves a supine torso. In the case of the former, the lateral surface of the underlying right knee is on or just above (~5°) the deposit surface, whereas the knees of the latter are elevated some 60-70 degrees above the disposal surface. In both cases, the persistent anatomic positions of patellae and the persistent labile connections within the feet attest to the overlaying of their corpses with fill, and thus decomposition in a closed space. Key points are that all lower limb angles are within normal ROM and that the feet are in an intermediate position relative to the torso. When the torso is supine with lower limbs in a stable upright knees configuration, hip flexion/knee elevation is at an angle of roughly 60 to 70 degrees. In this balanced stance, knee flexion is at an angle of about 115 degrees, the thighs evidence minor adduction, or movement toward midline, and there is scant, if any, rotation along a femoral axis. An important aspect of a stable upright knees posture involves an intermediate location of the feet, roughly 20-30 cm inferior to the buttocks, or in skeletal remains, the ischiopubic rami.

5.2.7.2 *Akimbo Postural Arrangement*

Most of the lower limb angles for the akimbo Burial 8 of West Cluster Room 336 are within normal ROM (Fig.5.6, lower left). The exceptions to this involve hip flexion/angle of elevation, lateral rotation of the femora, and ankle plantarflexion. The medial surfaces of the femoral condyles present superiorly and parallel to the deposit surface owing to the external rotation of the femora beyond normal ROM. Put another way, the lateral condyles lie flat upon the deposit surface and, by definition, have a hip flexion angle of 180 degrees. The right tibia is displaced posteriorly to the right femur, and the right fibula is displaced from the tibia. Even so, knee flexion can be extrapolated since right limb angles otherwise mirror those of the left limb. That knee flexion and all other ROM angles are normal indicates only a moderate degree of movement from anatomic position. In an akimbo configuration such as this, in which the feet are perhaps 20 cm or so superior to their most distal point when the limbs are in extension, is beyond the zone in which they can provide a stable support for the USF/S configuration. Considering this specific combination of abnormal ROM angles, and the moderate degree of tibia and fibula displacements, the interpretation here is that this individual was deposited in an open space in an akimbo position, with knees pointed to each side and somewhat elevated above the disposal surface. Eventually, both limbs collapsed upon the disposal surface during decomposition, resulting in the displacement of the right leg bones and contributing to the abnormal plantarflexion of the right foot.

5.2.7.3 *Fully Flexed Postural Arrangement*

As documented above in Figure 5.6's lower right schematic representation, the discovered skeletal configuration of Burial 24.2 evidences multiple hallmarks of fully-flexed lower limbs overlying a supine torso. Morris (1924:169) reports that the "arms and legs were mashed down along the sides of the trunk," so exterior to the abdominal cavity, and he also infers that the limbs were tightly bound at deposition. Apart from the superior halves of the femoral heads, all long bone regions are superior to the horizontal reference line. Left femur abduction is minor (~5°), and right femur (~25°) abduction is within the maximum 55 degrees occurring in a "deep squat." The anterior surfaces of the distal condyles rest directly upon the deposition surface, for a hip flexion angle of 180°. The proximal ends of both tibiae also rest upon this surface, so that knee flexion is also measured as a 180° angle. Such extreme hyperflexion exceeds the maximum physiological limit of 160°, which means that this configuration goes well beyond the angles occurring even with very tight binding. Even though foot bones appear to have been removed by burrowing animals, a sufficient number are in place to verify that the feet projected just beyond the hips at deposition. All told, the evidence points to tightly bound lower limbs that collapsed during decomposition, with the effect that the knees shifted somewhat laterally to either side of the torso, probably as a result of abdominal expansion during putrefaction, with all long bones per limb essentially in parallel. Morris (1924:196) also reports that Burial 24.2 and the two adjacent individuals were covered with refuse. However, in combination the location of the knees on the disposal surface beyond the abdominal cavity, the displacements of all long bones relative to each other, and the location of foot bones on the disposal surface indicate multiple vertical drops in elevation during decomposition in an open space. Moreover, the absence of discernible femoral rotations and unremarkable abduction signals a minor drop in vertical height without any twisting of the thighs.

5.2.7.4 *Collapsed Upright Knees Postural Arrangement*

A determination that lower limbs observed in a horizontal plane were rather in a configuration in which the knees were vertically oriented, or upright, at deposit is founded upon the co-occurrence of multiple ROM variables. In this case, abduction, adduction and rotation variables are particularly diagnostic of a significant alteration from the original postural arrangement. Figure 5.7 provides an example of the joint angles determined for HR 10, whose torso is supine. Unfortunately, all foot bones were removed by burrowing animals. Although the appearance of the right lower limb looks “normal”, every one of the assessable ROM variables is significantly beyond normal anatomic position. Correlation of data from these independent appraisals yields these key findings. Hip flexion angles for both limbs approach 180°. The lateral surface of the right femoral condyle lies flat upon the disposal surface whereas the anterior surface of the distal left femur, which rests directly upon the medial midshaft of the right tibia, is no more than 2-3 cm higher in vertical elevation. Also, abduction of the right femur (150° v 55°) is extreme, as is the hyperflexion of the right knee (170° v 145° normal/160° physiological). In addition, the superior presentation of the medial surface of the right medial femoral condyle equates to an abnormal external rotation (90° v 55°) of the femoral axis. Hip flexion/elevation of the left knee, left femur adduction and internal rotation angles are also significantly beyond anatomic possibility. In combination with the posterior presentation of the left os coxae, which lies flat upon the sacrum and right iliac blade in a non-anatomic position, these angles evidence a significant degree of downward and rotational movements concerning this limb. Independently, none of these measured angles can occur in a living person or a fresh corpse, nor can they take place when corpse decomposition occurs within a closed space (fill).

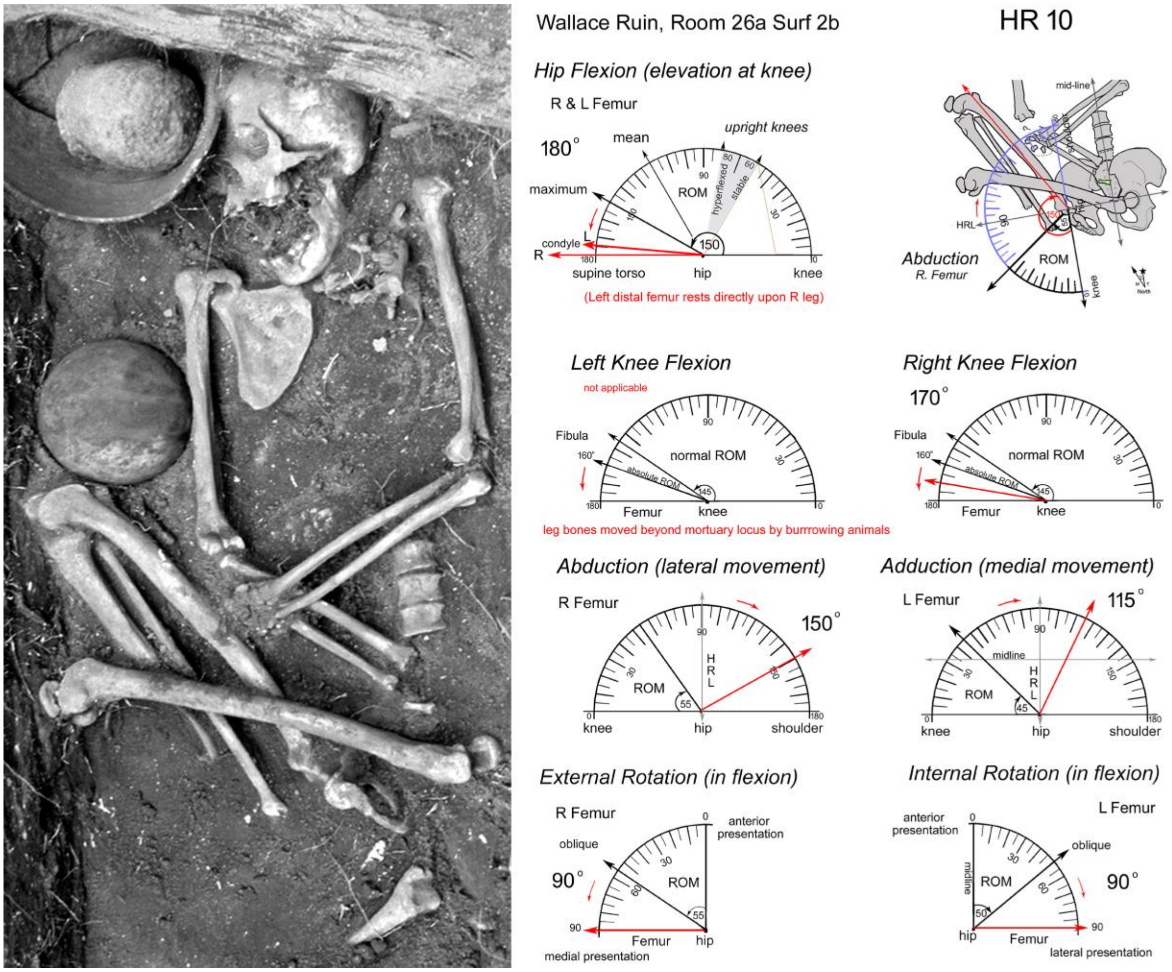


Fig. 5.7: Range of motion measurements for the lower limbs of HR 10. Notice also the dropped mandible and the inferior displacement and internal rotation of the left ulna in the field photograph.

Together, these pronounced non-anatomic angles point to the effects of gravitational forces upon loosening labile connections within the acetabular-femoral head joint, culminating in the downward, superior-lateral movements of the semi-flexed lower limbs. The extreme degree of HR 10’s femoral abduction and adduction do not occur in the straightforward vertical drops in elevation observed for limbs associated with an akimbo or fully-flexed postural arrangement. These two variables are thus key to the interpretation of the, perhaps, independent collapse of the lower limbs from an upright knees position: both entail extreme divergence from normal ROM that does not reflect a mere vertical drop in elevation. Rather, these measurements indicate the necessity for sufficient vertical space wherein these constellations of downward, twisting and rotational non-anatomic movements can transpire. The definitions of the archaeological contexts in which such movements can occur are provided in Section

5.3.4, along with those of other spatial categories and the methods used to identify and quantify their occurrence.

5.3 Archaeological Evidence

5.3.1 THE MORTUARY TRENDS DATABASE (MTD)

The Mortuary Trends Database provided in Appendix D consists of mortuary and demographic information regarding Pueblo II and Pueblo III human remains from Wallace Ruin and numerous San Juan Region sites, by primary burial. Skeletal information entails the primary burial number (when provided), age and sex. Postural arrangement (torso presentation and lower limb flexure) primarily concerns individuals in a surface room mortuary context. The primary sources of information comprise raw data provided on OAHP Pueblo II and Pueblo III electronic databases; these are made available only for approved scholarly research. As requested, the Office of the State of Colorado Office of Archaeological and Historic Preservation (OAHP) provided raw data on locations of all Pueblo II or III sites within the Montezuma County and a small section of southwest Dolores County in which human remains are reported

However, it was evident that the information was incomplete since several sites known by this researcher to have human remains were not included. Thus, the MTD includes data from 30 or so sites that are not listed in an OAHP inventory but which were identified during archival research conducted at multiple southwest Colorado libraries: the Anasazi Heritage Center, Crow Canyon Archaeological Center, Mesa Verde Research Center, Center for Southwest Studies of Fort Lewis College, Primtech Enterprises, Inc. and Woods Canyon Archaeological Consultants. Since a document's table of contents frequently does not note the presence of human remains, this data acquisition process also involved reading through a plethora of published and unpublished reports or manuscripts, i.e. "grey literature", involving excavation research within the study area. Moreover, since the OAHP databases merely identifies the occurrence of human remains at a site, these fundamental details were supplemented by the much more detailed information obtained from numerous publications, limited circulation reports (grey literature) and site forms;

these documents are identified in the relevant database. Additional online material comes from the Chaco Research Archive (CAR), an online scholarly resource. The inclusion of these data ensures that several sites populate each of the analytical units described below. From these efforts, there is reasonable confidence that a large proportion of MVR sites in which human remains have been reported are now included in the Mortuary Trends database. Moreover, each of the analytical units used in this study are represented by a several sites, at a minimum.

The bulk of OAHP mortuary data pertains to about 180 sites for which evidence regarding human remains solely involves observations made during an archaeological survey. Another 40 or so pertain to information obtained during limited testing, site monitoring, targeted recovery efforts by professional land managers, the retrieval of human remains from non-professional collectors, or archaeological endeavours for which documentation is not available. Information from these 120-odd sites does not contribute to this analysis of mortuary location choices. Also excluded are mortuary data observed during archaeological surveys or limited excavations of MSJR and Chaco “small house” sites.

As is often the case in archaeological research, some deviations from this preferred approach are required. Due to this project’s emphasis on interpreting the burial rooms of Wallace Ruin, sites in which primary burials are reported in a surface room mortuary context are included regardless of the excavation approach. Also, the residential midden was either not investigated, or only very lightly tested in several sites. Akins (1986:89) identifies this same problem in her assessment of mortuary data from the small habitation sites of Chaco Canyon. The presumed extramural midden of Salmon Ruin was removed by the flooding San Juan River (Reed, 2006). Fortunately, this is not a critical impediment to this analysis since the pervasive use of a midden mortuary context across time and space is so thoroughly documented.

5.3.2 CHRONOLOGICAL METHODS

This research makes use of dendrochronological (tree-ring) and ceramic evidence to segregate mortuary and residential occupation evidence from the Pueblo II and Pueblo III Periods. In this study, archaeological periods, or stages, are those identified in the Pecos classification as proposed by Kidder (Lipe et al., 1999:65). These periods delineate, in general terms, the practices and material culture shared by people from numerous kinship and language groups having diverse historical backgrounds. The corresponding dates are those presented by in *Colorado Prehistory: A Context for the Southern Colorado River Basin* (Lipe et al., 1999). The (approximate) starting and end points of these periods are derived from highly reliable dendrochronological evidence obtained from the juniper and pinyon tree beams used as structural timbers; these beams, from long-lived and climatically-sensitive species, also provide evidence for the region's paleoenvironmental reconstructions. These larger archaeological periods are subdivided into intervals, or phases in which tree-ring dates are correlated with ceramic types (Breternitz,1966; Lipe and Varien, 1999:260).

5.3.2.1 *Ceramic Seriation*

Ceramic seriation is used extensively to date Ancestral Pueblo fill deposits and burials, and it is the principal means by which sites located in archaeological surveys are dated. Table 5.3 reports the major white ware types by period and subperiod, along with common domicile architectural attributes as described by Varien (1999). In keeping with current regional research, the ceramic scheme applied follows Wilson and Blinman (1999). Fortunately, since all pottery types that provide the basis for most temporal assignments are San Juan wares, the chronological indicators used are suitable for all study areas. The Pueblo II white ware Chaco B/w (c. AD 1050-1150) is not included in this table since it is primarily found within Chaco Locality great houses. As it was manufactured only in Chaco Canyon, it indicates a connection to the Chaco Phenomenon network when found elsewhere. Ideally, it would be beneficial to evaluate mortuary trends by the refined groupings of Early and Late. Unfortunately, this is not possible owing to historical inconsistencies in the application of regional chronological systems, methodological problems associated with determining residence construction dates, and the difficulty in dating a specific mortuary context from ceramic vessels of long-standing or overlapping use.

Table 5.3: Chronological indicators for Pueblo II and III sites of the MVR. Dominant ware is italicised.

Period	White wares	Domicile Architectural Attributes
Early Pueblo II	*Cortez B/white*	upright slab wall foundations
AD 900-1050	Mancos B/white	jacal/daub walls
	Piedra B/white	mixed stone and adobe walls
	McElmo B/white	shallow earthen pitstructures
		single-stone wide masonry
Late Pueblo II	*Mancos B/white*	jacal/daub walls
AD 1050-1150	McElmo B/white	stone masonry walls
	Cortez B/white	shallow earthen pitstructures
		above-grade pitstructures
Early Pueblo III	*McElmo B/white* [a]	towers
AD 1150-1225	Mesa Verde B/white[a]	stone masonry walls
	Mancos B/white	linear roomblocks/multiple unit pueblos
		kivas
		dispersed settlements
Late Pueblo III	*Mesa Verde B/white*	towers
AD 1225-1300	McElmo B/white	stone masonry walls
	Mancos B/white	enclosing walls
		kivas
		Late Pueblo architectural block
		aggregated villages

[a] equal mixture c. AD 1180-1225

5.3.2.2 *Radiocarbon Dates (AMS)*

Five maxillary tooth samples from five individuals were submitted to the NERC Radiocarbon Facility Oxford upon the successful funding of a NERC (NF/2012/1/14) grant application prepared by this researcher and submitted through Prof. Bruce Bradley, University of Exeter. Sample selections were based on the need for more refined Pueblo III chronological evidence to test the Chacoan Revival and the Socio-Natural hypotheses. To avoid the possibility of collecting evidence from a single mortuary deposit episode, one maxillary tooth was obtained from five crania from four rooms, comprising two mortuary context types and one North Suite re-deposition. Room 17a has evidence from two individuals, but they are from different stratigraphic levels. The method used to convert the non-calibrated AMS results to the dates suitable for interpretation is described in Chapter 6. All teeth are from crania located years before May 1990 and the adoption of State of Colorado regulation 36CFR80 part 13, which legislates the handling of Native American human remains discovered on state and private lands. In response to a query submitted to Assistant State Archaeologist Kevin Black (June 2009), consultation with the Colorado Commission of Indian Affairs regarding destructive analysis of these Wallace teeth is neither possible nor required.

5.3.3 SOCIAL SCALES OF ANALYSIS: PLACES OF THE LIVING

5.3.3.1 *Region*

This study evaluates residential and mortuary information by multiple scales and subject matter, with the largest units denoted as regions. Although ecologically-based drainage subdivisions are typically used to appraise Ancestral Pueblo subsistence and settlement patterns (Gleichman and Gleichman, 1991; Lipe et al., 1999), Varien (1999) made use of analytical units oriented toward social demarcations in his study of MVR sedentism and mobility. In order of decreasing scale, these analytical units consist of the region, locality, community, and the site. As defined by Varien (1999:24), the region “encompasses the sustaining areas for many communities whose combined interaction produced distinct regional architecture and pottery traditions”.

5.3.2.2 *Locality*

A locality is larger than a residential site but smaller than a region (Varien, 1999:5). It can be based either on geographic variables or an arbitrary measurement. This rather nebulous scale actually provides flexibility in research applications since it may designate a single community or it can include multiple communities and the nearby lands that sustain them. At a larger scale, it may constitute neighbouring communities that share common histories or lifeways somewhat different from groups living in a substantially different eco-zone. Such a demarcation is consistent with the size of Chaco Canyon, or the Chaco Locality, even though its associated mortuary evidence holds the same hierarchical position as data from the substantially larger MVR and MSJR analytical units.

5.3.3.3 *Community*

A community, according to Varien (1999:19-23), "consists of many households that live close to one another, have regular face to face interaction, and share the use of local, social and natural resources." He goes on to say such communities have their own specific temporal, geographic, demographic, and social dimensions; further, that the social dimension includes historical conditions which integrate the elements of time and space, influencing the creation of local rules which shape community structures and practices. The spatial clustering of residential sites identifies archaeological communities, though most conclusively when associated with public architecture. Such community clusters can comprise individual farmsteads dispersed over several kilometres, compact villages, or in the case of the Lakeview Group, multiple great houses.

5.3.3.4 *Domiciles: the three-component configuration*

In this investigation, the domicile is the social unit most directly associated with Ancestral Pueblo mortuary evidence and, presumably, mortuary location decisions. As defined by Varien (1999:23), primary permanent residences, or domiciles, "have distinct boundaries and contain structures and middens used by one or more households." He thus excludes ephemeral campsites, field houses, shrines and the like. The unit pueblo is the archaeological correlate of a single, two or three-generation household related by lineage or marriage (Varien, 1999:95; Varien et al., 2007:275). Three-component domiciles were the most common dwelling between 1050 and 1300, regardless of whether existing as an isolated farmstead or integrated into multi-unit hamlets or villages (Varien, 1999). The first component entailed a roomblock of contiguous surface rooms that provided living and storage quarters. The second major domicile component was a large, one-room subsurface structure situated a short distance south of the roomblock and in which the floor and walls were either partly or completely below ground level, whether a kiva, pit room or pit house. Its adobe roof served as part of the house's courtyard. The household performed various activities of daily life within the extramural zone, the third major component of a domicile. This area contained smaller subsurface pits for storage and the extramural midden, typically situated south of the courtyard. Green Stone Pueblo of Site 5MT6970 is a typical Pueblo II domicile (Fig. 5.8). Archaeologists apply various terms to designate individual unit pueblos amassed within a single building (B. Bradley, 1993b; Karhu, 2000; Mobley-Tanaka, 2005). During Pueblo II and III times, most subsurface structures are kivas. Thus, for consistency's sake, in this study a kiva's archaeological designation specifies an individual unit pueblo. For example, 5MT3.73 signifies the Site 5MT3 domicile that contains Kiva 73.

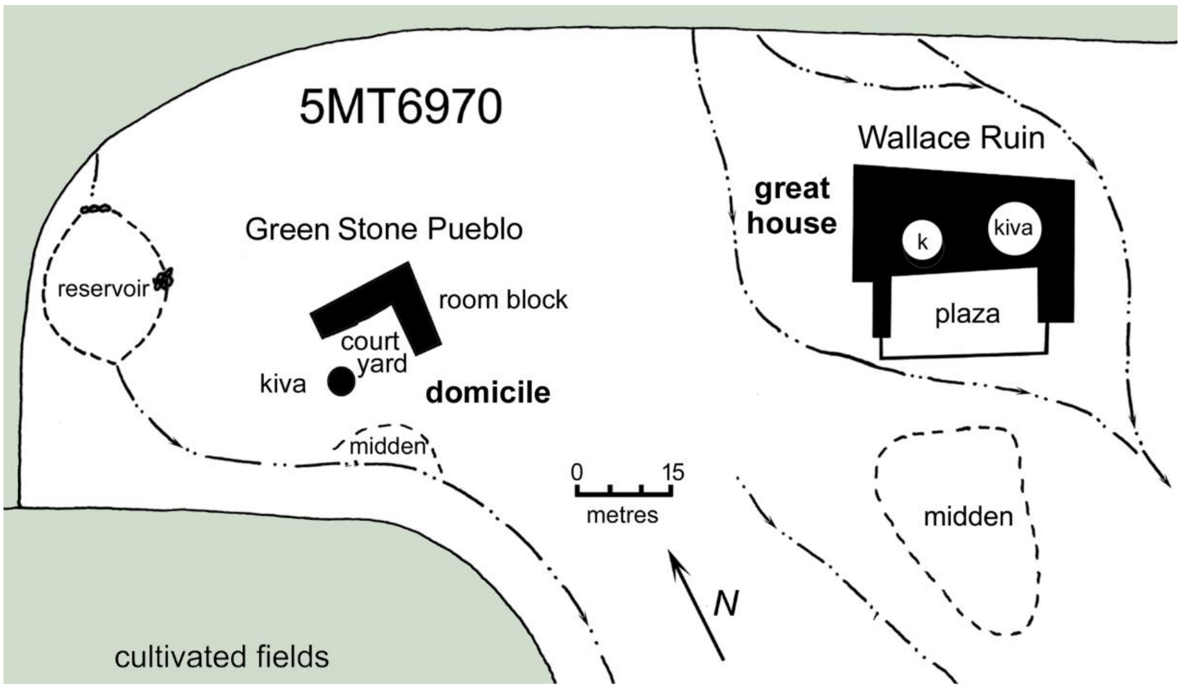


Fig. 5.8: Footprint of Green Stone Pueblo, a typical Pueblo II domicile, compared to that of the nearby Chacoan great house of Wallace Ruin. Adapted from an unpublished map created by B. Bradley.

5.3.3.5 *Great houses*

Archaeologists generally interpret such large-scale buildings as Wallace Ruin as public architecture (Lekson, 1984; Reed, 2008b; Van Dyke, 1999; 2003), though some researchers infer some residential usage as well (Durand, 2003; Reed 2008a). Unlike large villages, these massive buildings are not comprised of kiva units. Yet, despite the disproportionately high number of rooms versus kivas, such sites are also organised in terms of the fundamental three-component plan of the Ancestral Pueblo domicile (Lekson, 1984),

5.3.4 MORTUARY CONTEXT TYPES (MCT): PLACES OF THE DEAD

As is exemplified in Chapter 7's focused discussion of the subfloor versus floor mortuary context interpretation for Burial 14 of Pueblo Bonito's Room 33, one of the chief difficulties encountered during this study involved the problem of ambiguous terminology. Accordingly, this section specifies the criteria for each mortuary context as used in this thesis. In archaeological terms, a mortuary context refers to the vertical and horizontal location (provenience) of a primary burial deposit, though it can also include associated items and architectural features. The presence of non-perishable grave inclusions provides an additional indicator of a deliberate mortuary program, but in Ancestral Pueblo groups the absence of such is not unusual. As defined here, a *mortuary context type*, or MCT, refers only to the location of a mortuary context. Specifically, it pertains to the category of place.

Ten MCT constitute the locational categories used herein, which were independently identified during the literature review of MVR evidence. Each is associated with one of the three major components of a typical Ancestral Pueblo domicile or great house. Each MCT is evaluated in terms of occurrence per great house or domicile (kiva unit) and by number of primary burials. In brief, three are associated with the roomblock, four involve the subsurface structure, and three are, typically, within the extramural component of a domicile.

The range of MCT essentially replicates the categories employed by Karhu (2000:21) in her appraisal of the mortuary behaviours of Sites 5MT1 and 5MT3 of the Yellow Jacket community. The only significant difference is that the method applied here does not consider whether a deposition in a fill or midden context was interred in a pit since this information is inconsistently reported in the literature. These categories are also similar to the seven used by Schlanger (1992:19) in her study of Ancestral Pueblo mortuary practices of the northern San Juan Basin and the eight types employed by Stodder (1987:352) in her appraisal of mortuary evidence obtained during the Dolores River Project.

5.3.4.1 *Roomblock Component: Surface Room Fill*

A room or structure fill context is assigned when stratigraphic evidence indicates that a primary burial is on or within a deposit of cultural or natural fill, or if the evidence indicates a corpse on a floor was deliberately covered with cultural refuse at deposition. This category also includes an intrusive burial that is within 5 cm of a prepared floor surface.

5.3.4.2 *Roomblock Component: Surface Room Floor*

A room floor is defined as a prepared horizontal surface that is constructed from clay, adobe, or native sand. A use surface is a level surface on accumulated fill in which objects (either artefacts or skeletons) share a horizontal plane. A mortuary context is floor-associated if a primary deposition is within 5 cm of fill accumulations above a prepared floor. Natural fill accumulations may cover a primary burial in a room floor MCT, but not refuse or sediment deposits indicative of human intent. Evidence of fill removal in a deliberate attempt to clear a floor space merits a floor MCT designation.

5.3.4.3 *Roomblock Component: Surface Room Subfloor*

A room subfloor MCT pertains to deposition within an intrusive architectural feature (burial pit) that is cut into or through a prepared floor; specifically, it is a feature of that floor. Shallow or uneven depressions within an intact floor surface are excluded. This category also excludes pits, and primary burial deposits lacking evidence of a pit, located under a floor but which lack stratigraphic evidence of intrusion through the overlying floor. It is understood that it can be difficult to ascertain if a pit below the level of a floor represents a feature associated with intrusion through a floor or one in which an extramural locus is subsequently overlain by a building. Therefore, ambiguous cases involving floor condition or recording deficiencies are allocated to this context.

5.3.4.4 *Subsurface Structure Component: Fill, Floor and Subfloor*

The second major domicile component consists of large, one-room habitable structures, or subsurface structures with floor and walls either partly or completely below ground level, whether a kiva, pit room or pit house. The location categories associated with such subsurface structures comprise subsurface structure fill, floor, and subfloor MCT; the criteria for each subsurface room context are consistent with those for surface rooms. In addition, the Other Architectural category covers any architectural feature not defined above. It primarily comprises architectural elements accessory to the kiva main chamber, though tunnels, post holes, and small extramural pits are also allocated to this category.

5.3.4.5 *Extramural Component: Storage Feature*

This term is reserved for features that are primarily associated with food storage, such as subsurface pits, granaries and field houses. In Ancestral Pueblo archaeology, these include extramural pits that are cut into native soil and which are significantly larger and deeper than is necessary to accommodate a primary deposition. This category also includes recessed vessels in which a jar is nestled into a small subfloor pit.

5.3.4.6 *Extramural Component: Grave/Burial Pit*

This feature refers to a hole created specifically for the interment of a human body and that is excavated into relatively horizontal native ground or a talus slope. However, since wind-blown soil and constructional deposits can obscure abandoned architectural units, this MCT also includes any extramural subsurface pit that originates on a ground surface regardless of the nature of the underlying stratum. A subsurface burial pit that is overlain by more than an incidental trash deposit is assigned an extramural midden mortuary context.

5.3.4.7 *Extramural Component: Midden*

In archaeological nomenclature, a midden is a rubbish accumulation, often forming a mound, that contains ashy deposits, processed animal bones and material culture artefacts indicative of a human settlement. Although the term can be applied to any trashy accumulation regardless of location within a site, in this study it is reserved for deposits in extramural locations. The term residential midden pertains to the household refuse mound, or rubbish tip.

5.4 Statistical Methods

The goal for the application of statistical methods is to ascertain whether variables pertaining to the mortuary use of Wallace Ruin are distinctive. The purpose is not to conduct an intensive analysis of mortuary programs used in different San Juan Region sites or communities. Moreover, the intent is to establish reasonable confidence that the patterns observed are meaningful rather than to generate statistically unassailable determinations of significance. Although the data obtained are not the product of a non-random sampling method, information comes from sites situated in different localities, a wide range of archaeological references, and independent research projects.

Confidence calculations for MVR data are derived using the hypergeometric formula: n = N(z2) pq/(E2(N-1) + z2pq. The Pueblo II results are based on sites only, since most sites from this period comprise a single residence. In contrast, both sites and residences are included for the Pueblo III findings due to the comparatively higher number of residences per site. A 95% significance level with a 5% error requires a sample size some two to three times larger than that of either the P2MLD or P3MLD samples. It is not possible to obtain archaeological datasets of this magnitude given the nature of the reported evidence and the strictures of this mortuary location study. However, a 90% confidence level is obtained using a confidence interval of 10%, which means that findings from this archival research provide a credible basis regarding mortuary location decisions made during the Pueblo II and Pueblo III occupations of the Mesa Verde region.

Simple statistical tests are used to identify possible meaningful associations and to eliminate those results that are more likely to be the product of random variation. Observed counts of scale variables run the gamut from very small to very sizeable, in Ancestral Pueblo archaeological terms. Lowrey's (2001-2017) online calculator for the Fisher's Exact Test (3x2 contingency) is used to compare the overall configuration of roomblock mortuary evidence between groups in respect to the occurrence of three key variables: number of roomblocks, number of rooms, and number of primary burials in roomblocks. However, the ways in which these variables are combined represent different actions, or intentions, such as number of burials per room. Although researchers use statistical tests performed with Anova to identify points of variation between ratios in multi-variable analyses, the mortuary evidence from most of these SJR datasets do not meet the testing requirement for a normal distribution nor similar variance between groups. Instead, a case by case analysis of variable combinations provides needed insights into points of variation. However, Fisher's is not suitable for tests in which the total number of observations exceeds 300, as occurs in some assays involving the number of rooms excavated or total number of individuals. An additional complication is that some proportional comparisons involve both large and very small samples. This means that in some cross-tests the numbers involved are too small for a reliable Pearson or Yates chi-square result and, at the same time, too large for Fisher's Exact Test. Accordingly, the N-1 Two-Proportion Test, performed with Suaro's (2012) online calculator, is the primary statistical method applied since it is suitable for tests that involve large and small samples. A comparative study shows that the N-1 is the optimum test policy when the minimum number is 1 (Campbell, 2007). All proportions are tested systematically, regardless of the potential for determination of a meaningful difference.

The evaluation of domicile mortuary evidence comprises two subgroups. The principal dataset comprises data from suitable sites that contain at least one primary burial deposit (PBD) in any location. A second dataset pertains only to evidence from the Mesa Verde Region. The Appraised (APP) group includes MVR mortuary location evidence plus negative evidence from 25 extensively excavated sites with no observed primary burials. This second group, or Supplemental sites, is used in the statistical analysis of the prevalence of surface room in MVR domiciles since it provides a more reliable basis to establish the validity of interpretations regarding MVR mortuary location options. In contrast, the less intensive interrogation of the sources used for the MSJR and CCL assessments identified few suitable sites with such negative evidence.

The next chapter presents data and interpretations specific to Wallace Ruin derived from the methods described above. Comparative data and interpretations then proceed in Chapters 7 through 10, by mortuary variable. Other Wallace material culture information pertaining to the house society attributes identified in Chapter 11 were acquired using the same interrogation of primary field documents and subsequent laboratory analyses conducted by Bruce Bradley.

Part B

Analyses, Interpretations and Conclusions

CHAPTER 6

SKELETAL AND MORTUARY EVIDENCE FROM WALLACE RUIN

6.1 Introduction

The purpose of this chapter is to present fundamental skeletal and archaeological evidence from Wallace Ruin that is used to evaluate four propositions regarding its atypical Pueblo III mortuary program. Confirmation that the Pueblo III use of Wallace Ruin involves an anomalous Ancestral Pueblo mortuary practice undescribed in the archaeological literature of the Mesa Verde Region hinges upon several considerations. Foremost is confirming the accuracy of Bruce Bradley's (1988, 1993a; 1996; 2010a) designations of 16 skeletons as primary burials and his conjecture that the disordered skeletal elements in the North Suite are secondary burial deposits. The second need pertains to validating his interpretations (1988: Tab. 6; 2010:133) regarding the specific deposition contexts, or mortuary context type (MCT), of all primary burials and, also, of all disordered and damaged human remains. As the great house was used in both the Pueblo II and Pueblo III Periods, a third element relates to the temporal allocations of all human remains. The fourth requirement goes to the identification of basic demographic evidence pertaining to age, sex and number of individuals present and, also, determining whether the observed skeletal damage arises from natural or cultural factors. This demographic evidence, contributes to the fifth need, which pertains to evaluation of the scale of use of the great house, by both number of individuals deposited and number of rooms used. This resolution is essential since a few Pueblo III individuals or locations would not be particularly distinctive from the Pueblo II mortuary program at Wallace, or as is addressed in subsequent chapters, compared to those adopted at other sites.

6.1.1 BACKGROUND

Bradley (1988:Tab.6; 2010a) allocates primary burials to various mortuary contexts, including some designations not used in this study (i.e., "floor cairn"). For the most part, his assessments present no information about whether such contexts are associated with cultural fill. This researcher's detailed analysis of Wallace Ruin site formation processes for these rooms indicates that none of these remains were deliberately overlain with such materials. This is a critical point, since, as is addressed in Chapter 7, Ancestral Pueblo primary burials are strongly associated with such strata. Moreover, a deposit context in which a corpse is "removed from sight" is perhaps the most prevalent aspect of mortuary behaviour worldwide (Parker Pearson, 1999).

This circumstance raises two possibilities. One is that this mortuary program represents the desire to adhere to house society protocols, remembered or perceived, as Chacoan. Another point to consider is whether the mortuary evidence is sufficient to imply that these corpses were construed as "powerful dead" (Dillehay, 1995; Isbell, 1997) who retained some semblance of agency on behalf of their community, however that group was constituted. If so, such interactions may leave such traces as the subtle displacement or loss of peripheral skeletal elements or even the patterned removal of larger bones (Nilsson Stutz, 2003; Rakita et al., 2008).

Unfortunately, these assessments are significantly hindered by three intrusions into the great house after all corpses were nearly or completely skeletonised. Some 1500 isolated bones in disordered deposits are located on floors of North and South Suite rooms. Bradley (1988) infers disturbance of primary burials in the South Suite by scavenging carnivores and the consequent re-deposit of these bones to a secure location in the North Suite; by Ancestral Puebloans is implied. In addition to these, an intrusion into Room 17a by humans disturbed an unknown number of burials, though no bones have peri-mortem damage. Yet another human intrusion involving Room 27a disturbed the subfloor mortuary context of an individual evidencing peri-mortem trauma. The synopses presented in Section 6.2.1.3 establish that the disturbances of the primary burials HR 4 of 17a and HR 11 of 27a by humans were intentional; in addition, Chapter 11 provides a detailed treatment of these events. Also, a full examination of the carnivore intrusion is available in Appendix E. However, although relevant information from these separate analyses is included in this chapter, the primary emphasis is on *in situ* and inferred primary burial deposits, using the methods described in Chapter 5.

In addition, as noted in Chapter 3, multiple archaeological investigations have identified MVR skeletal assemblages in similar states of anatomic disorder that appear to be the product of deliberate post-mortem processing. Primary evidence for this interpretation involves such peri-mortem damage as cut-marks, chop-marks and the like that can only be produced by humans (White, 1992; Kuckelman et al., 2000; Karhu, 2000; Lambert; 2014). Such deposits are interpreted as evidence of intentional violence with no mortuary component involved. Consequently, the pertinent question is whether peri-mortem damage at Wallace Ruin dates to the time of primary deposit or during post-deposition disturbance. If attributable to human intent at the time of death, Bradley's argument that these disordered deposits are from disturbed primary burials is weakened considerably. In such case, a scale of use by number of primary burials and number of rooms utilised would be significantly reduced.

6.1.2 APPROACH

To evaluate the question of variant practice at Wallace Ruin, the specific mortuary locus of every primary burial is re-considered here. Accordingly, the aims of this chapter are threefold: descriptive, interpretive, and comparative in respect to Wallace evidence. A thorough description of each mortuary context or post-depositional disturbance is essential to identify an atypical behaviour and to document the observed range of variation. Summary information is provided in publications or reports produced by Principal Investigator Bruce Bradley (1974; 1988; 1993a; 2010a), but this effort presents a much more comprehensive analysis. These descriptions include the interpretation of each micro-environment associated with a human remains deposit and changes in this context over time, to separate natural events from intentional human actions or reactions. Comparison of Wallace's variant mortuary program to other sites and burial populations are reserved for Chapters 7 through 10. The results of these analyses are applied in Chapter 13, which considers Wallace Ruin mortuary practice in terms of house society and the broader themes pertaining to memory and identity. Of note, analyses are presented here at the inter-individual scale, drawing upon information from the mortuary biographies provided in Appendix B.

6.2 Human Skeletal Remains: Descriptive

Sixteen individuals (HRs) are represented by skeletons retaining moderate to significant degrees of anatomic order, for a total of 2429 bones. Of these, 15 are within the great house and one is in the extramural midden. In addition to these, a total of 1589 isolated skeletal elements (ISE) from disturbed contexts are in the West Arm (1517), the Annex (2) and the extramural midden (72). West Arm ISE are in near-complete disarray, and mainly located within North Suite (818) or South Suite (401) ground-storey rooms. Not counted in this figure are bones re-associated to one of the West Arm skeletons based on metric or morphological similarities, developmental attributes, or colouration. Although Pueblo II (P2WR) remains are discussed when relevant, Pueblo III (P3WR) skeletal remains are the focus of this thesis.

To review, the term "*primary burial deposit*" refers to a specific kind of physical deposit produced when a body still retains normal anatomic connections and is disposed of in a position and location indicative of deliberate and patterned placement of a corpse, followed by *in situ* decomposition (Duday, 2006:14). The term *primary burial* refers to the individual, and *Isolated Skeletal Element* (ISE) refers to a non-articulated skeletal element (tooth or bone) that cannot be re-associated to a primary burial. *Links* comprise ISE that are matched to a paired bone (antimere) or an anatomic unit, such as a vertebral column, using metric or morphognostic characteristics. Most Links involve single sets of antimeres (paired bones); however, re-associations comprising cranial and infra-cranial elements are identified as an *Individual Link*. Deposits comprised of non-articulated skeletal elements result from a range of circumstances, including intentional and accidental disturbance by humans or natural processes involving site deterioration or animal behaviours. Consistent with Marden's (2011:181) perspective, the terms *disarray* and *disorder* are used for skeletal deposits evidencing few, if any, anatomic connections rather than *disarticulated*, since the latter can suggest human intent. Finally, in *anthropologie de terrain* nomenclature, *in situ* refers to the specific mortuary location, or depositional/decomposition context. This can be different to the archaeological meaning of the term, which considers whether an object has been removed from its contextual associations during excavation. In such case, an ISE moved across a room by a burrowing animal is *in situ* when revealed during excavation. In this study, the former definition is used to identify primary burial deposits that can be associated to a specific primary deposit locus. The labels HR for skeletons and iLinks for re-associated cranial and infra-cranial elements are descriptive. The identification of an individual as an *in situ* (HR) or inferred (iLink) primary burial is admittedly interpretive. However, the primary burial designation is used for both to mitigate the descriptive complications arising from the post-deposition disturbances. The rationales underlying these designations are provided Section 6.3.

6.2.1 POST-DEPOSIT DISTURBANCES

Wallace Ruin's skeletal population is significantly affected by various post-depositional disturbances. The three main problems involve animal burrowing, scavenging by canids, and the intentional disturbance of two skeletons by Ancestral Puebloans. Synopses of these three events are provided below.

6.2.1.1 *Natural, Animal Burrowing*

The West Arm of the great house is suffused with a hodgepodge of filled-in animal burrows. Many are located adjacent to walls, but others meander across a room, between strata, and even between adjacent structures. Some pathways are discernible due to colouration or the presence of nesting materials. However, this is not always the case. For instance, on one occasion, B. Bradley used black plastic sheeting to denote the excavation boundary when the field season ended prior to the full excavation of a room. By the time fieldwork again commenced, he found pieces of this black plastic throughout the room's "unexcavated" strata even though there was otherwise no evidence of rodent burrows. This black plastic has since been found in apparently undisturbed strata, including those in adjoining rooms. Of the genera of animals involved in such tunnelling, the most likely candidates include field mice, rabbits, and prairie dogs.

The only Wallace Ruin remains with scant or no disturbance by burrowing animals are in subfloor pits. Otherwise, skeletal dis-associations typically involve displacements within the area of the body or nearby. For the most part, the affected skeletal regions comprise the small bones of the hands and feet. However, as is also documented in Figure 6.1, both small and larger bones have been transported, or re-located, across a room, into a higher or lower stratum, and even between rooms connected by a doorway.

The re-association of bones to a specific individual is straightforward regarding minor displacements, when bone size and skeletal development are diagnostic, and when the elements remain in the room of deposition. On the other hand, such determinations are less reliable or not possible when the bones from same-aged individuals are co-mingled. Room 17a contains the extensively scattered bones of two more infants similar in size and development to HR 2. Both the number of infant ISE ribs, vertebrae and bones from the hands and feet, as well as several pairs of antimeres, indicate that these elements are from two completely disordered skeletons rather than single, intrusive bones from other contexts. Accordingly, the re-association of small bones, including phalanges, was not attempted except for those near the *in situ* bones of HR 2.

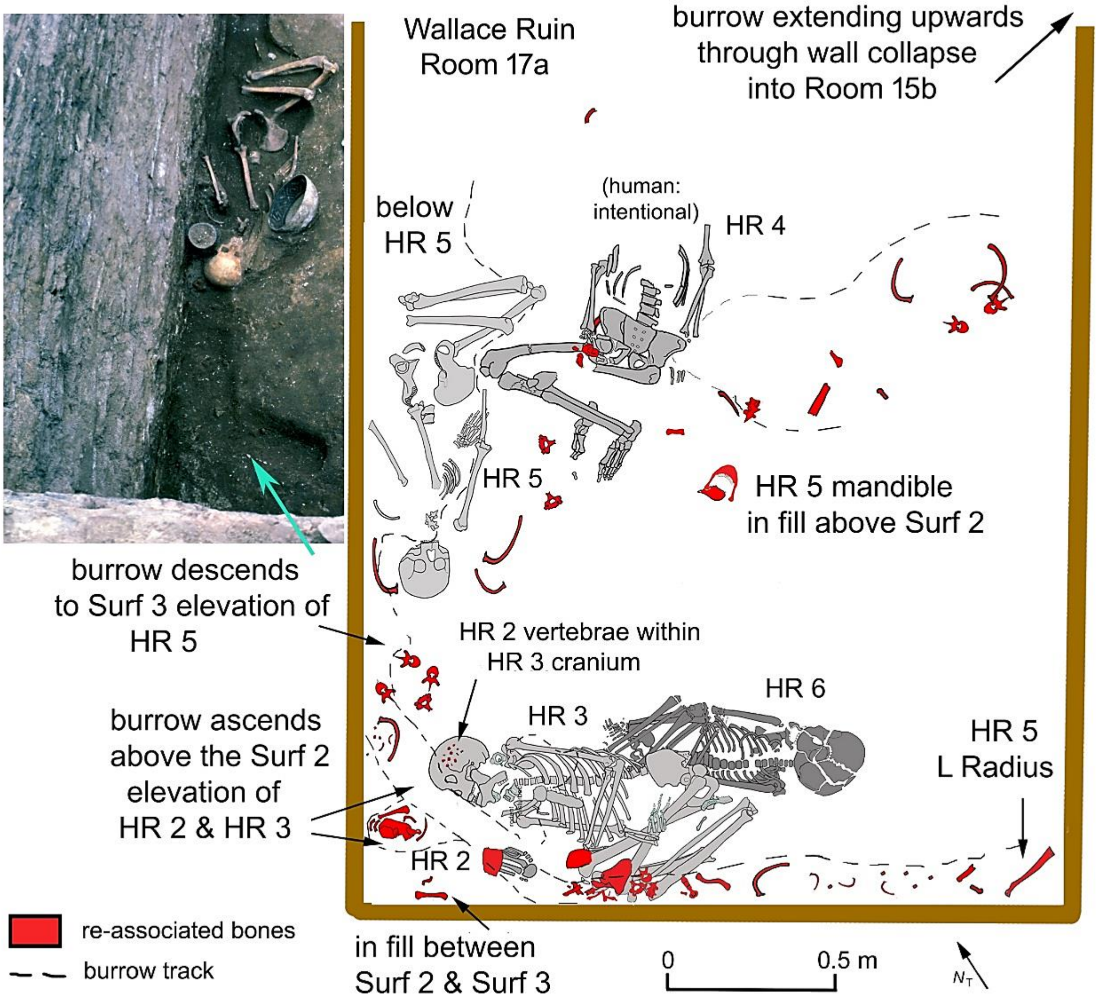


Fig. 6.1: Effects of animal burrowing on the anatomic integrity of primary burials in Room 17a of Wallace Ruin.

6.2.1.2 *Natural, carnivore*

Of the 1379 suitable isolated P3WR bones, 15% (203) retain evidence of the tooth bites, tooth marks, or gnawing damage that has been ascribed to carnivores in both retrospective (discovered) and actualistic (controlled) forensic research (Haglund, 1997; Lotan, 2000; Pokines and Tersigni-Tarrant, 2013). Some 30 bones with damage of an ambiguous nature are excluded from consideration. Figure 6.2 compiles photographs representative of damage, by category type.

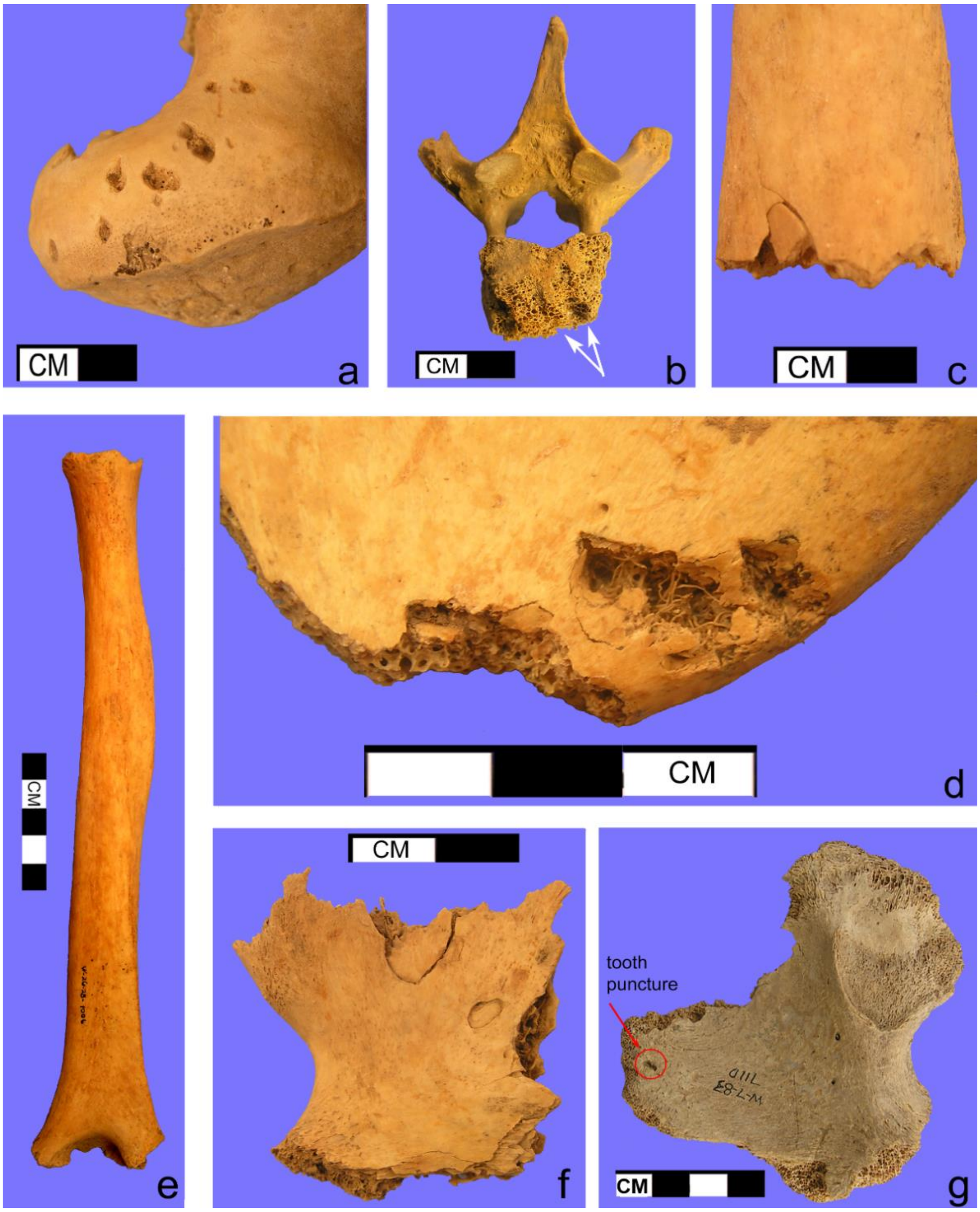


Fig. 6.2: Photographs of carnivore damage and weathering occurring as common taphonomic conditions in Pueblo III isolated bones at Wallace Ruin: a) tooth pits and punctures; b) tooth furrows; c) adhering flakes; d) tooth punctures and gouges, associated with radiating fractures; e) removal of bone ends (reduction to a bone cylinder); f) loss of large regions of bone; and, g) weathering in association with tooth punctures and loss of bone regions.

6.2.1.3 *Intentional, Human*

Two primary burials were deliberately disturbed when skeletonised. In brief, although the head and most elements from the upper torso of the adult male HR 4 of Room 17a are missing, the remaining bones observable in the Figure 6.3 field photograph are articulated in an ordered arrangement. Most convincingly, HR 4 rests upon a woven willow mat and, based on the distribution of cotton cloth remnants within the inferior body, was shrouded.

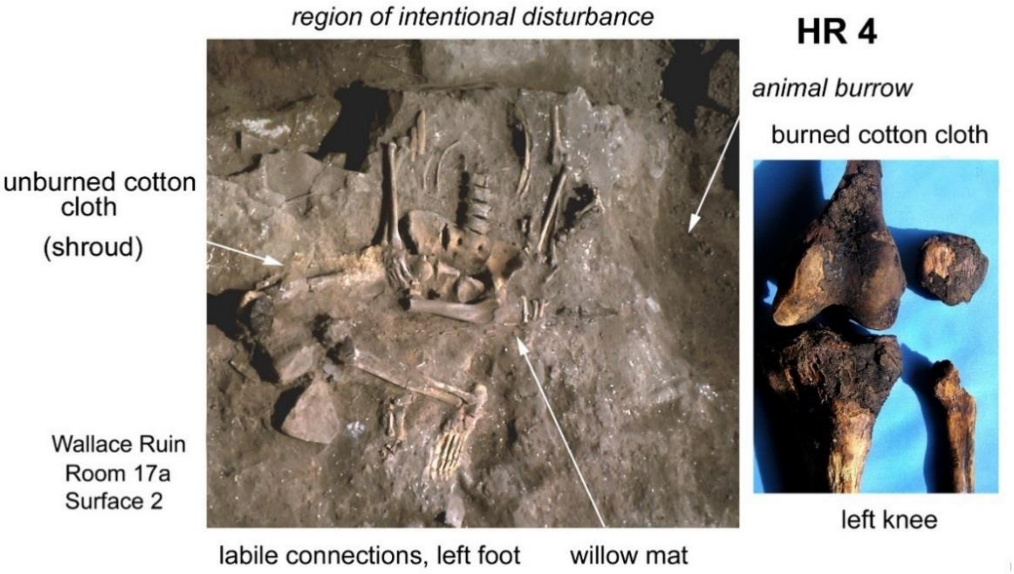


Fig. 6.3: Photographs of the disposal context of HR 4, highlighting the significant post-disposal disturbances and evidence for classification as a primary burial deposit.

The status of the disturbed mortuary context of HR 11 at discovery is documented in the Figure 6.4 photograph below. The undisturbed bones of his lower limbs and feet rest upon the base of the subfloor burial pit in Room 27a. Also present are undisturbed grave goods. The remaining skeletal elements were removed and then re-deposited.

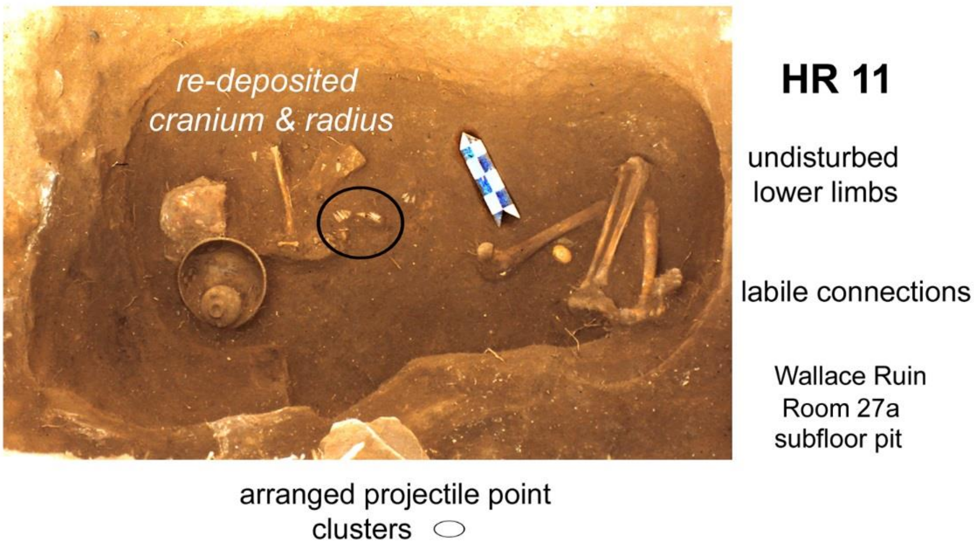


Fig. 6.4: Field photograph of HR 11's undisturbed lower limb bones and grave goods in the Room 27a subfloor pit. The re-deposited cranium, radius and hand bones are not in anatomic position.

6.3 Mortuary Deposits: Chronology and Locations

The horizontal locations of *in situ* deposits are identified in the West Arm plan provided in Figure 6.5, by HR designation. The exact deposit locations of iLinks 366, 835, 836 and 867 are unknown. Remnants of a woven mat and the commingled remains from several individuals indicate that at least one more primary burial was deposited in Room 26, in addition to HR 10. However, the skeletal representation is insufficient to designate any remains as an Individual Link. Those rooms containing significant concentrations of human bones are colour-coded by area of canid-disturbance (green) and re-deposition of disturbed elements (yellow). Details regarding intrusive elements moved by animals or structure collapse are not included in these synopses or Figure 6.5.

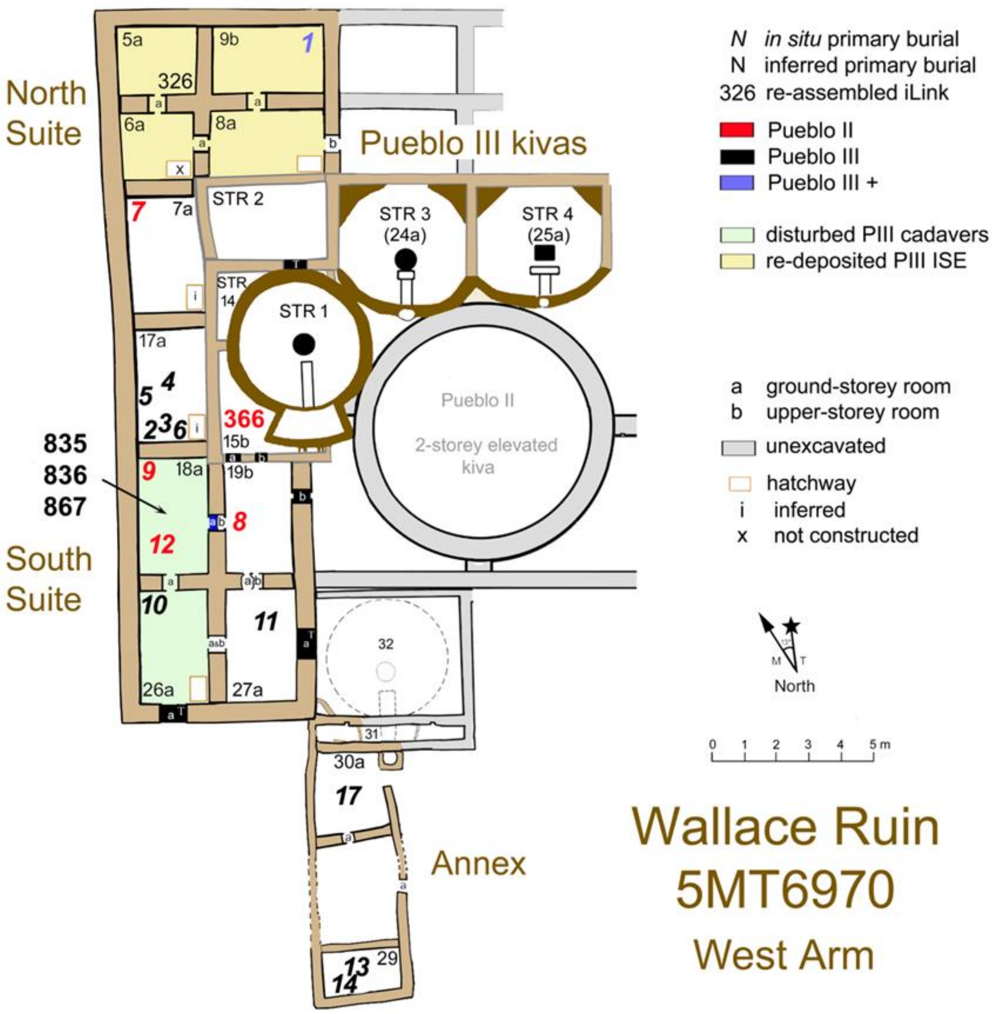


Fig. 6.5: Great house locations of in situ and inferred primary burial deposits, canid-disturbed Pueblo III disordered elements, the secondary mortuary treatment of iLink 326, and commingled human bones re-deposited by Ancestral Puebloans.

In addition, summary chronological information for burial deposits is provided in Table 6.1, by archaeological period and date range. Temporal allocations are based on associated grave goods, AMS results, or location on a surface dated by ceramic seriation or other chronological evidence. The AD 1120 date is based on Phase 3 construction dates, AD 1180 refers to the recognised year for the introduction of Mesa Verde Black-on-white pottery, and AD 1280 represents the end of the Ancestral Puebloan occupation of the Four Corners. This table also includes assessments regarding relative chronology of deposition sequences.

6.3.1 PRIMARY BURIAL DEPOSITS

6.3.1.1 *c. AD 1040-1120*

No primary burials are in Structures 2, 14, 24 or 25 of the early great house. The adult male HR 15 was apparently interred in the extramural midden between about AD 1090 and 1150. This individual was located during formal, though very limited, testing of the midden (Bradley, 1993a). No non-perishable grave goods were observed, and the fill within the immediate area of the skeleton contains few sherds. However diagnostic ceramic evidence from the underlying and overlying fill deposits suggests corpse disposal during Construction Phase 2 or 3-3a. He could thus be associated with either the founding Old Wallace or the expanded great house.

6.3.1.2 *c. AD 1120-1150*

Excluding midden burial HR 15, four individuals are in locations available only after great house expansion at about AD 1120. A fifth individual is in an Old Wallace room. In each case, stratigraphic or ceramic associations are indicative of death prior to the local abandonment of the great house around AD 1150. The infant HR 7, deposited upon the floor of ground-storey Room 7a, has no grave goods but underlies Pueblo II cultural fill. Both HR 9 and HR 12 are located within ground-storey Room 18a.

Table 6.1: Wallace Ruin primary burial deposits (*HR* s and iLinks), by individual, room, chronology and probable sequence.

ID	Room	Period	Date/AD	Disposal sequence
1	9b	PIII+?	> 1260s	last of the 16 primary burials; after North Suite ISE re-deposits; possibly Numic
2	17a	PIII	1180-1218 ±[b]	after HRs 5 and 6; either after or with HR 3; possibly, similar time-frame as HR 4
3	17a	PIII	1180-1218[a]	equivalent AMS results to HR 11; after HRs 5 and 6; similar time-frame as HR 4
4	17a	PIII	1180-1218 ±[b]	after HRs 5 and 6; similar time-frame as HRs 2 and 3
5	17a	PIII	1180-1203 ±[b]	prior to HRs 2, 3 and 4; similar time-frame as HR 6
6	17a	PIII	1180-1203[a]	earliest AMS date; prior to HRs 2, 3 and 4; similar time-frame as HR 5
7	7a	PII	1120-1150	indeterminate other than PII
8	19b	PII	1120-1150	unknown regarding PII burials; prior to PIII ISE in STR 19
9	18a	PII	1120-1150	after HR 12; unknown regarding other PII burials; prior to PIII iLinks and ISE in STR 18
10	26a	PIII	1180-1254[a]	latest/same AMS date as iLink 326; prior to ISE in 26a
11	27a	PIII	1180-1218[a]	similar AMS results to HR 3; after HRs 5 and 6; prior to HR 10 and PIII ISE in STRs 26 and 27
12	18a	PII	1120-1150	earliest burial in Room 18a; prior to HR 9; prior to PIII iLinks and ISE in STR 18.
13	29	PIII	1180-1280	double burial; after HR 14; indeterminate other than PIII
14	29	PIII	1180-1280	double burial; before HR 13; indeterminate other than PIII
15	ExMid	PII	1090-1150	unknown regarding PII burials; prior to PIII burials
17	30a	PIII	1180-1280	indeterminate other than PIII
326	5a	PIII	1180-1248[a]	latest/same AMS date as HR 10
366	15b	PII	1120-1150	unknown regarding PII burials; before insertion of STR 1
835	18a	PIII	1180-1280	probably later than HR 5 and HR 6
836	18a	PIII	1180-1280	probably later than HR 5 and HR 6
867	18a	PIII	1180-1280	probably later than HR 5 and HR 6

[a] pooled ceramic and/or AMS evidence (95.4% probability); [±b] same surface as HR dated by AMS

The young child HR 9 is confidently assigned to the late Pueblo II Period, or McElmo Phase, based on associated artefacts and stratigraphy. Infant HR 12 is unaccompanied by grave goods, but stratigraphic evidence is also compelling. This foetus-neonate rests upon the floor constructed during great house expansion, which is itself overlain by another prepared floor and then fill strata containing diagnostic ceramics associated with the McElmo Phase occupation.

The only primary burials in an upper-storey room comprise two foetus/neonates deposited between AD 1120 and 1150. It is worth noting that a mortuary context within an upper-storey room is inconsistent with the location of well-dated Pueblo III primary depositions on the ground-storey floors. Neither infant has associated grave goods. Based on the presence of labile connections, HR 8 is a primary burial deposit, whereas iLink 366 may be a primary burial deposit. The location of HR 8 in Room 19b of the West Wing means that corpse disposal occurred after AD 1120. Ceramics on the deposit surface (Surf 1) and in overlying strata date this individual to the Late Pueblo II Period. A total of 34 cranial and infra-cranial remains from foetus-neonate Link 366 of Room 15b are within Strata 4 and 5, which are below the upper-storey use-surface (Surf 1) and the Pueblo III Kiva 1. Ceramic seriation dates both strata and Surface 1 to AD 1130-1150 (Late Pueblo II). Although an animal burrow extended between Rooms 17a and 15b, the number of re-associated bones suggests that disposal was in 15b rather than displacement of skeletonised elements or small anatomic units by animals from 17a; in addition, there are no antimeres in Structure 17. The actual position of this infant is unknown since the bones were scattered across and mixed within strata that were quite disturbed by construction activities associated with the insertion of the kiva in this upper-storey room. It is indeterminate if Link 366 was deposited upon the floor or within structural fill.

6.3.1.3 *c. AD 1180-1280*

The 13 Pueblo III primary burials comprise 10 *in situ* remains and three disordered iLinks inferred as canid-disturbed primary burials. Although their mortuary contexts were subsequently disturbed by humans, the mortuary contexts of HR 4 (17a) and HR 11 (27a) retain numerous elements in their deposit locations. A fourteenth individual (iLink 326) was accorded a secondary mortuary treatment when several bones were re-deposited in Room 5a in a structured deposition. The five burials (HRs 2-6) of Room 17a comprise the largest concentration of *in situ* remains in the West Arm, though HRs 5 and 6 are on the lower of the two Pueblo III floors. Rooms 26a (HR 10), 27a (HR 11) and 30a (HR 17) have one individual each. The two *in situ* burials (HRs 13 and 14) of Structure 29 comprise the only certain double-burial at Wallace Ruin. The commingled bones of Individual Links 835, 836 and 867 are from disturbed mortuary contexts in Room 18a.

Four *in situ* primary burials have fine-grained, calibrated AMS dates derived from tooth root collagen, as does iLink 326 (secondary mortuary treatment). However, these results provided in Table 6.2 represent the dates associated with tooth root formation. To determine the approximate date for age at death, results are calculated using the difference between the means for tooth root formation, per relevant tooth type, versus age-at-death in accordance with Ubelaker's (1989) atlas for North American Indians. Dental standards are appropriate for each category in the cases of subadults HRs 3, 6, 10 and iLink 326; however, since mature adult HR 11 died some years after the completion of dental development, skeletal (os coxae) criteria are used instead.

Table 6.2: Adjustments made to uncalibrated AMS dates to account for the time span between age by tooth root development and age at death. Error ranges are assumed to be consistent between original and modified results.

Individual	tooth type	age, root development	age/dental arcade	difference (years)	uncal. AMS root dev.	uncal. AMS death
HR 3	M_3	15 y ± 36 m	15 y ± 36 m	0	884 ± 25 BP	884 ± 25 BP
HR 6	M^1	8 y ± 24 m	8 y ± 24 m	0	907 ± 25 BP	907 ± 25 BP
HR 10	PM_1	12 y ± 30 m	15y ± 36 m	3	862 ± 26 BP	859 ± 26 BP
HR 11	M^1	8 y ± 24 m	37 ± 2 y[a]	29	914 ± 24 BP	885 ± 24 BP
iLink 326	M_2	15 y ± 36 m	15 y ± 36 m	0	862 ± 24 BP	862 ± 24 BP

[a] pelvic development

The data used to obtain the approximate date of death for each individual are provided below in Table 6.3. Initial adjustments use the uncalibrated AMS date; differences are subtracted since dates are reported as BP (before present). Then, results are calibrated using OxCal 4.1 (https://c14.arch.ox.ac.uk). In most cases, modifications are minor or unnecessary since age by root formation and overall dental development are equivalent or inconsequential. However, adult HR 11 died some two or more decades after dental maturity.

Table 6.3: AMS calibrated probabilities for Wallace Ruin teeth, corrected for date at death. Results prior to AD 1180 are excluded on the basis of direct or indirect association with Mesa Verde B/w ceramics.

Individual	uncal./AD	error/y	68.2% (AD)	95.4% (AD)
HR 3	884	25	1154-1206 (52.3%)	1119-1218 (67.9%)
HR 6	907	25	1146-1164 (13.6%)	1198-1203 (0.9%)
HR 10	859	26	1164-1214 (68.2%)	1151-1254 (88.9)
HR 11	885	24	1153-1206 (50.7%)	1119-1218 (67.2%)
iLink 326	862	24	1164-1210 (68.2%)	1151-1248 (88.8%)

Accordingly, his late 30s age-at-death is estimated from development of the os coxae (Brooks and Suchey, 1990; Lovejoy et al., 1985). The standard deviation for his Phase 4-II pubic symphysis score is 9.6 years, which is significantly higher than the 2 to 3 year ranges associated with dental development. Thus, the possibility exists that death occurred as much as some four decades following completion of his first molar root. Yet, even this adjustment is trivial since the calibration of AD 885 extends the latest date within the larger, second deviation (95.5%) by just three years.

Judging from the independent and combined interrogation of the first and second deviations, it appears that all five mortuary deposits occurred AD 1180-1220. Three of these individuals have results that require further comment. Second SD results for HR 10 and iLink 326 allow for the possibility that death and deposition occurred closer to the mid-1200s. However, raw data provided in Table 6.4 by five-year intervals (AD 1180-1280) indicate that the chances that either died later than 1220 are extremely slight (<0.006). The 68.2 percentile results for HR 6 indicate that death occurred prior to AD 1165, and thus barely within the McElmo Phase of the early Pueblo III Period. However, associated Mesa Verde B/w ceramics indicate deposit after 1180, consistent with the 95th percentile's upper end date of 1203. That HR 6 predates the other individuals by several years regardless of confidence interval is consistent with stratigraphic evidence since HR 6 underlies HR 3.

Table 6.4: Raw AMS results for Wallace teeth, evidencing the negligible probabilities (red) that HR 10 or iLink 326 died between AD 1220 and 1275.

Year/AD	HR 6	HRs 3 & 11	HR 10 & iLink 326
1180.5	0.003436	0.010462	0.013391
1185.5	0.0027937	0.009866	0.014083
1190.5	0.0019045	0.00815	0.014301
1195.5	0.001543	0.00727	0.014163
1200.5	0.0021684	0.008403	0.013921
1205.5	0.001841	0.007856	0.014085
1210.5	0.0010274	0.005626	0.013259
1215.5	0.000446	0.003403	0.011333
1220.5	0.0000588	0.0008285	0.005622
1225.5	0.000006231	0.0001524	0.002016
1230.5	0.000005728	0.00013698	0.0018189
1235.5	0.000009537	0.00021163	0.0024831
1240.5	0.000010964	0.00023544	0.0026548
1245.5	0.000006603	0.00015297	0.0019536
1250.5	0.000006161	0.00013894	0.0017706
1255.5	2.0401E-06	0.00006087	0.0010645
1260.5	2.11E-07	0.00000982	0.00030226
1265.5	1.01E-08	7.45E-07	0.00004676
1270.5	0	1.12E-07	0.00001064
1275.5	0	0	1.0726E-06

6.3.2 DISTURBED SKELETAL ELEMENTS

Based on close evaluation of archaeological evidence associated with strata and use surfaces by study unit, 1444 ISE are Pueblo III in age, and just 116 are in Pueblo II contexts. Bones from strata that became mixed during the insertion of the Pueblo III Kiva 1 (Structure 1) into the Pueblo II upper-storey floor and fill units of Room 15b contain 29 ISE classed as Indeterminate Pueblo II-III. Significant to this study, all bones used in advanced analyses are assigned to the Pueblo III Period with high confidence.

No AMS dates were submitted for disturbed skeletal remains other than iLink 326 of Room 5a. Most of the ISE are either from disturbed primary burials deposited in 18a and 26a of the South Suite and the adjacent Room 17a or were re-deposited in the four rooms of the North Suite. Although animal burrowing has moved a few bones to a lower stratum, almost all of the ISE in 26a are on or above Surf 2a. Mesa Verde Black-on-white sherds rest upon this Pueblo III use-surface, which overlies Surf 2b and the well-dated remains of HR 10. In the adjacent Room 18a, a Mesa-Verde Black-on-white mug sits upon the same Pueblo III use-surface (Surf 2) as three iLinks and a few ISE.

Whether the AMS result for iLink 326 is representative of North Suite re-deposited elements is unknown. However, that ISE in Rooms 5a and 6a occurred between AD 1180 and 1280 is certain since Mesa Verde B/w sherds are present in overlying fill strata. Moreover, an expedient hearth situated on the upper contact zone of Strat 6 of Room 6a is overlain by fill containing Mesa Verde B/w sherds. Finally, the taphonomic signature common to iLink 326, the ISE adjacent to or slightly above HR 10 (26a) and numerous North Suite ISE suggests a fair number of the individuals represent disturbed depositions from the AD 1180-1220 timeframe.

Though the dispersed and commingled bones in Room 18a share the taphonomic signature produced by scavenging canids, no tooth from that room was submitted for AMS dating. Thus, in contrast to the circumstances noted above, it is not possible to use AMS results for an indirect estimate of their deposition timescales. On the other hand, evidence for deposit in the early 1200s is provided by the correlation of corpse decomposition processes with stages of skeletal disarticulation and loss of elements by scavenging carnivores (see Appendix E). As noted above, the disturbed elements of Surf 2 of 26a were deposited after HR 10. The occurrence of vertebral and foot articulated anatomic units (AAU) in Rooms 26a, 5a (including iLink 326) and 18a (iLink 867) signals that four cadavers were in a similar, incomplete state of decomposition when disturbed by canids. Accordingly, it seems that disposal of the 18a iLinks occurred roughly the same time as iLink 326 (5a) and the remains overlying HR 10 (26a).

Although the relative chronology of the Annex burials with respect to other Pueblo III deposits is unknown, it seems that the West Arm proper ceased to be used as a mortuary locus after the intrusion of scavenging canids. All South Suite surfaces associated with disturbed primary burials represent the final use of those rooms. The individuals in Room 17a were unaffected by canid scavenging, so it is a point of interest to ascertain whether mortuary activities shifted to this room as it was accessible only through a hatchway. The precise temporal relationship between HRs 2, 3 and 4 of Room 17a is indeterminate. However, all three individuals rest directly upon Surf 2, which, in the absence of varying accumulations of silty floor fill, suggests no more than a few years apart, if that. Based on the AMS dates of HR 3 of 17a, this would mean depositions for all three individuals no later than AD 1220 by all measures, as is the case for HR 11 of Room 27a. If so, then there is a very good probability than none of the 17a individuals on Surf 2 post-date HR 10 (Room 26a) or iLink 326 (Room 5a), or at least not to any discernible degree and regardless of standard deviation. In other words, no good evidence suggests that the intrusion of scavenging animals prompted the use of Room 17a.

6.3.3 COMPLETENESS AND PRESERVATION OF PUEBLO III REMAINS

Slightly more than 2700 bones and teeth belong to the P3WR subset, irrespective of anatomic relationship. Summary details regarding the ten *in situ* primary burials are summarised in Table 6.5 regarding the number of observed versus expected bones. The number of expected bones per individual considers age class variations regarding the presence of primary and secondary ossification centres, followed by the union of those centres into a single element (Scheuer and Black, 2002). For example, the perinatal cranium consists of 29 separate unfused elements (excluding ear bones) whereas a mature cranium can be tallied as one bone. The criteria applied for expected bone representation by age class are provided in Table E.2 of Appendix E.

Table 6.5: Skeletal representation of P3WR HRs relative to the expected number of bones per major age class.

HR #	2	3	4	5	6	10	11	13	14	17	Total
Age Group	*I*	*AO*	*A*	*AO*	*C*	*AO*	*A*	*AO*	*A*	*AO*	
N observed	99	145	150	114	134	127	134	152	130	148	1333
N expected	**198**	**179**	**179**	**179**	**190**	**179**	**179**	**179**	**179**	**179**	**1820**
% present	50%	81%	84%	64%	71%	71%	75%	85%	73%	83%	73%

A Adult; AO Adolescent; C Child; I Infant

Of note here, since the appearance of the patellae is variable in young children, this bone is not included in the inventory of expected elements for the Child age group. However, since one patella of HR 6 is present, this paired element is counted among this child's expected elements. To evaluate vault and face representation, a complete cranium is inventoried by element with these exceptions: comparative analyses exclude the small bones of the face (lacrimals, ethmoid, vomer, turbinates and ear bones) and the non-squamous centres of the vault (*pars lateralis, pars basilaris, pars petrosa*). An unfused epiphysis can herald the presence of a long bone even when the diaphysis is missing. However, although inventoried, epiphyses are not evaluated in terms of expected presence given the developmental variation in timing of appearance. Indeterminate bone fragments and loose teeth are excluded.

Skeletal completeness among these ten skeletons is generally quite high, with 75% (1333/1820) of inventoried bones present on average. The lowest percentage (HR 2) is still a moderate 49% (99/198), whereas four individuals (HRs 3, 4, 13 and 17) are represented by more than 80% of the expected bones. Though HR 2 has the least complete skeleton, there is a good possibility that methodological insufficiency is in play. This infant is one of three disturbed skeletons of very similar age and development in Room 17a, and several bones that might belong to any one of these individuals are not re-associated given this uncertainty. The robust (73%; 130/179) skeletal representation of HR 14 could also be higher since 31 bones excluded from consideration were not observable during field analysis.

To identify patterns of bone loss by skeletal regions, Table 6.6 provides a breakdown of the occurrence of bones for these primary burials and for all P3WR ISE, including those assigned to Individual Links; patellae are grouped with the bones of the lower limb. Even though every ISE is assigned to an age group, these identifications are sometimes tenuous due to element condition. Accordingly, calculations of the expected numbers of ISE by skeletal region are derived using 18 bones for which age estimates are reliable and which cannot represent more than one individual. These bones, which represent six infants, four children, three adolescents and five adults, are also included in the appraisal of the P3WR age-sex structure, in addition to the 10 *in situ* burials. The results of the ISE calculations for expected numbers of bones are an approximation since the actual number of individuals and age groups represented are unknown. On the other hand, since the total number of individuals (28) is close to the Pueblo III MLNI of 32, the likelihood is that this subgroup of 18 individuals is reasonably representative of P3WR remains.

Not unexpectedly, and as is evident in Figure 6.6, there is a marked difference between the prevalence of bone representation *in situ* remains compared to those from disordered contexts. Element presence for primary burial deposits are very close to expected values (100%), with the greatest loss of elements involving the hands and feet. These small bones constitute more than half (106/192) of the skeletal elements in an adult skeleton, as allocated in this scheme. Hence, the case of the adult male HR 4 provides an apt example regarding their disproportionate contribution to skeletal representations in archaeological contexts. Even though several major bones (cranium, mandible, scapulae, and right humerus) were removed during an intentional disturbance by humans, his percentage of skeletal completeness is still high (84%; 150/179) because he has an almost full complement of extremity bones.

Table 6.6: Expected and observed representations of bones from P3WR primary burials and isolated bones, by skeletal region.

	In situ primary burials		*Isolated bones/iLinks*	
	Expected	Observed	Expected	Observed
Total bones	1895	1425	3484	1252
Cranial, vault	81	71	150	116
Cranial, face	64	53	128	37
Cranial, chin	11	10	24	19
Torso	576	486	1198	562
Upper Limb	60	58	108	72
Lower Limb	78	75	124	97
Hand	522	365	876	210
Foot	503	307	876	139

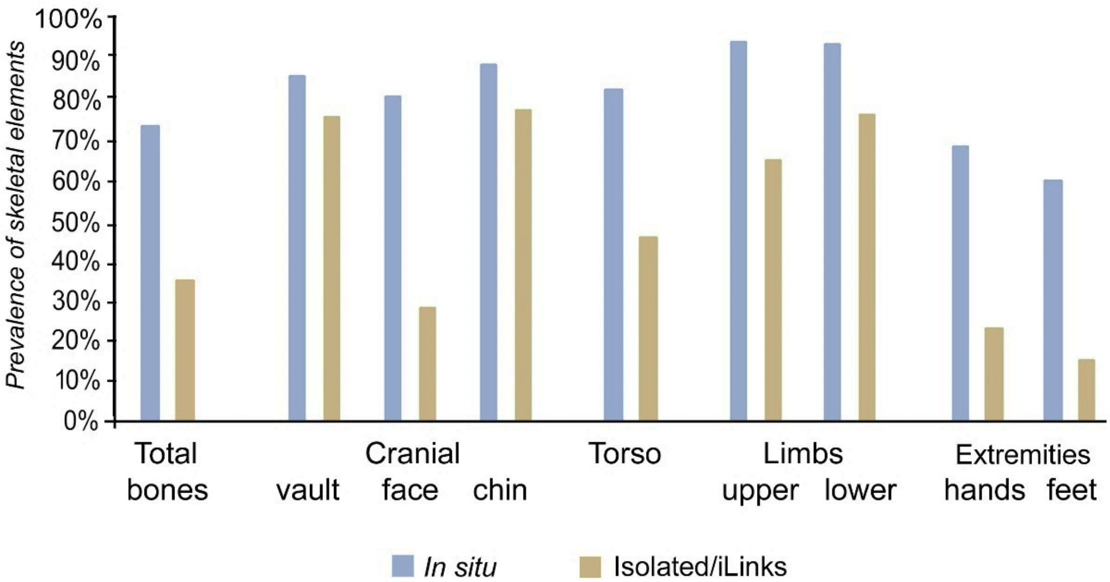


Fig.6.6: Prevalence of skeletal element representation for P3WR primary burials compared to isolated skeletal elements, by major anatomic unit.

The extent of missing bones is quite pronounced in ISE remains, with roughly one-third of skeletal remains represented overall. The occurrence of vault, chin and limb bones is more substantial. However, the inventory of ISE vault bones may be inaccurate since it includes small cranial fragments that can neither be re-associated to a larger fragment nor excluded as representative of a unique element. Roughly half of the expected number of torso bones are present, but the representation of bones from the face, hand and feet is poor.

6.3.4 DEMOGRAPHY

6.3.4.1 *Population estimates: MNI and MLNI*

A significant effect of the post-deposition disturbances is that the number of observed primary burial deposits does not accurately represent the size, or scale, of the burial population for either period. The paucity of inter-suite re-associations may mean that Bradley's (1988) supposition that the North Suite re-deposited bones came from South Suite burials is incorrect, or at least not completely accurate. However, this scenario cannot be eliminated from consideration owing to the extent of the carnivore damage and because it is seldom possible to match upper and lower limb elements to the same individual. Accordingly, the value of pooling spatial data per temporal period reduces the potential that an individual is counted more than once. The use of multiple element types avoids the problem of the non-representation of an individual by a single element type. Therefore, formulas for the Most Likely Number of Individuals (MNLI) and the Minimum Number of Individuals (MNI) are employed to approximate the scale of use of Wallace Ruin by number of corpse depositions as represented by primary burials and ISE. Following the conjoining procedure described in Chapter 5, calculations were performed for the MLNI and MNI using Konigsberg's (Adams and Konigsberg, 2004) interactive spreadsheet. The MNI, which provides a count of the most common element found in an assemblage, is used for comparative purposes because it is the formula most widely used by Ancestral Pueblo researchers. However, the MLNI formula is also used for the Wallace Ruin paleodemographic analyses since it provides a more accurate count of the original death assemblage (Ibid., 2004:148). A determination of each of these calculations involves averaging the independent results from the four most common skeletal elements, though the representation varies by archaeological period. To contextualise these data, Pueblo II remains are evaluated in the same manner though with different homologous elements.

The population estimates derived using elements from all Wallace Ruin locales are presented in Tables 6.7 and 6.8 by the four most common suitable elements per chronological period. In addition, data are presented by Isolated Skeletal Elements (ISE) and Primary Burial/Individual Links (PB/iLinks) subsets, along with the total number of sided elements and paired bones. Population estimates for Pueblo II remains (P2WR) are limited to MNI calculations since no set of homologues meets the minimum of five pairs required for a reliable result (Adams and Konigsberg, 2004). Fortunately, the representation of Pueblo III (P3WR) homologues is robust. Calculations using varying combinations of homologues yield comparable results.

Then, Table 6.9 summarises the results of the population estimate analyses for the three major chronological periods, by major site component. Pueblo III individuals comprise 79% of this skeletal population, and they are five times more common when considering only remains within the West Arm. The Pueblo II MNI of 10 is twice the number of *in situ* or inferred primary burials for that timeframe. The MLNI determination of 32 individuals for the Pueblo III use of the West Arm of Wallace Ruin is probably a reasonably accurate result, considering that some pair-match identifications are less than certain. However, an estimate in the upper twenties to mid-thirties is secure. By this reckoning, the number of *in situ* or inferred primary burials constitutes slightly less than half of the Pueblo III MLNI (14/32). The doubling of each population estimation over the number of observed primary depositions demonstrates the necessity for including ISE in evaluating scale of use by number of individuals.

It is uncertain whether HR 1 dates to the late Pueblo III occupation of the MVR or is perhaps an intrusive Numic (Ute) burial from the prehistoric-early historic period. The latter is the more probable considering the absence of cranial deformation and the extent of building collapse by the time of deposit. Regardless of this uncertainty, the mortuary evidence pertaining to this HR 1 is clearly inconsistent with that observed in all other West Arm rooms.

Table 6.7: MNI and representation of selected homologous P2WR bones by side and pairs, per Isolated Skeletal Elements and Primary Burial/iLink subsets.[1]

	MLNI	MNI	*PB and iLinks*			*ISE*			*Total*		
			L	R	Pairs	L	R	Pairs	L	R	Pairs
Parietal		**5**	5	4	4				5	4	4
Scapula		**10**	5	5	4	3	1		8	6	4
Humerus		**8**	5	4	4		3		5	7	4
Femur		**6**	4	4	3	1	1	1	5	5	4
Overall		**10**									

Table 6.8: MNI, MLNI and representation of selected homologous P3WR bones by side and pairs, per Isolated Skeletal Elements and Primary Burial/iLink subsets.[1]

	MLNI	MNI	*PB and iLinks*			*ISE*			*Total*		
			L	R	Pairs	L	R	Pairs	L	R	Pairs
Scapula	**33**	**30**	11	9	9	12	13	6	23	22	15
Humerus	**28**	**26**	12	12	10	7	9	4	19	21	14
Femur	**30**	**29**	14	13	13	11	10	6	25	23	19
Tibia	**33**	**31**	12	14	12	10	12	5	22	26	17
Overall	**32**	**31**									

[1]Calculated using Konigsberg's (Adams and Konigsberg, 2004) interactive spreadsheet for multiple elements.

Table 6.9: Population estimates for the Wallace Ruin death assemblages, by period and in total. Calculated using the Adams and Konigsberg (2004) Excel spreadsheet for multiple elements.

Period	MNI	MLNI
Pueblo II		
West Arm	6	
Extramural Midden	4	
Pueblo III		
West Arm	31	32
Pueblo III-Numic		
West Arm	1	
Total	42	32

6.3.4.2 *Age and Sex*

Table 6.10 lists 38 individuals represented by one or more elements suitable for estimation of age and sex, by chronological period. Although the estimation of age is most reliable for those individuals represented by both cranial and infra-cranial elements, age estimates comprise all individuals represented either by a suitable dentition or at least one os coxae.

Table 6.10: Age and sex data per Wallace primary burial and suitable ISE.

Individual	Age	Age Group	Sex
		Pueblo II	
HR 7	9 m ± 3 m	Infant	Unknown
HR 8	B ± 2 m	Foetus/Neonate	Unknown
HR 9	5 y ± 16 m	Child	Unknown
HR 12	B ± 2 m	Foetus/Neonate	Unknown
HR 15	35-50+	Middle/Old Adult	Male
iLink 366	B-6 m	Infant	Unknown
ISE 1909	18 m ± 6 m	Infant	Unknown
ISE 1910	18 m ± 6 m	Infant	Unknown
ISE 1911	B-1 year	Infant	Unknown
		Pueblo III	
HR 2	9-12 m	Infant	Unknown
HR 3	15-18 y	Adolescent	Male
HR 4	35-44 y	Middle Adult	Male
HR 5	15-18 y	Adolescent	Female
HR 6	8 y ± 24 m	Child	Unknown
HR 10	15-18 y	Adolescent	Female
HR 11	35-39 y	Middle Adult	Male
HR 13	15-18 y	Adolescent	Female
HR 14	50-59 y	Old Adult	Female
HR 17	15 y ± 3 y	Adolescent	Female?
iLink 326	15-18 y	Adolescent	Female
iLink 835	6 y ± 2 y	Child	Unknown
iLink 836	6 y ± 2 y	Child	Unknown
iLink 867	20-30 y	Young Adult	Female
ISE Os coxae			
Link 261	22-25 y	Young Adult	Male
5.24.266	50 -59 y	Old Adult	Female
18.5.790		Adult	Unknown
Link 1038	35-39 y	Middle Adult	Male
ISE Mandible			
6.46.40	6 m ± 3 m	Infant	Unknown
6.62.119	6 m ± 3 m	Infant	Unknown
6.62.120	2 y ± 8 m	Infant	Unknown
6.81.185	3 y ± 12 m	Infant	Unknown
9.27.1794	6 y ± 24 m	Child	Unknown
17.185.469	15 ± 3 y	Adolescent	Unknown
Link 502	6 m ± 3 m	Infant	Unknown
17.190.656	18 m ± 6 m	Infant	Unknown
18.5.794	15 ± 3 y	Adolescent	Unknown
26.28.1010	6 y ± 24 m	Child	Unknown
		Late PIII/Numic?	
HR 1	3 y ± 12 m	Infant	Unknown

It is possible to estimate sex of ISE long bones by the application of cut-off points, but that is not done here so as not to inadvertently duplicate information from a single individual using multiple skeletal elements. None of the three ISE mandibles from the extramural midden (1909-1911) have associated grave goods, but nearby ceramic sherds indicate a Pueblo II timescale.

From these data, all but one of the nine Pueblo II individuals represented are subadults, and most (7/8; 78%) are infants at that. Although excluded from this tally on methodological grounds, an isolated mature humerus recovered from the extramural midden indicates the presence of another adult or an older adolescent. A key point is that no Pueblo II adult remains on this list are located within the great house.

A mature calcaneus that could belong to an adult or older adolescent was found in Room 25a fill. However, how it came to be in that Old Wallace stratum is unknown, but that this calcaneus was the only ISE in that multi-storey structure suggests that its presence is unrelated to human intent. Only the remains of adult male HR 15 are sufficiently mature for a determination of sex. On the other hand, although long bone robusticity is not used in this analysis, the small, gracile but fully mature humerus ISE in the midden indicates the presence of at least one adult female. Ceramic seriation of refuse within the vicinity of this bone is consistent with a Pueblo II origin.

The results of the Pueblo III burial population are compiled in a single chart that correlates age and sex data per individual (Table 6.11), excluding HR 1. Despite the small sample size, all age groups other than foetal/neonates are represented, as are both sexes. In contrast to the Pueblo II subgroup, every one of these remains is in a great house room. For clarity and ease of comparison to expected mortality profiles of comparative populations in subsequent chapters, the Pueblo III age structure is depicted in Figure 6.7 immediately below this table.

Age group occurrence for primary burials (including iLinks) has a distribution of one infant (B-3 y), 3 children (4-12 y), six adolescents (13-19 y) and four adults (20+y) when adult age groups are pooled; the pattern is 1-3-6-1-2-1 when all groups are segregated. Calculations that include ISE ossa coxae and mandibles yield near-equivalent rates for infants (25%) and adolescents (28%). Neither prevalence is considerably higher than that of children (18%), but all are substantially greater than the representation for each of the adult subgroups. The Young and Old Adult categories contain only two (6%) individuals each, Middle Adults (9%) are three in number, and the remains of two individuals can only be aged as Adults. When all adult data are pooled, the number of individuals (9) is in line with the representation observed for each of the three subadult categories. Overall, the ratio of subadults to adults is unbalanced, whether by the larger subgroup of 28 Pueblo III individuals (20:8) or by primary burials (10:4).

Table 6.11: Population Structure of Pueblo III individuals from Wallace Ruin.

Age/y	Age Group	U	F/PF	AMB	M/PM	Total	Prevalence
F	Foetus/Neonate					0	0%
2 m-3 y	Infant	7				7	25%
4-12	Child	5				5	18%
12-19	Adolescent	2	5		1	8	28%
20-35	Young Adult		1		1	2	7%
36-50	Middle Adult				3	3	11%
50+	Old Adult		2			2	7%
20-50+	Adult	1				1	4%
Total		15	8	0	5	28	99%

AMB Ambiguous; F Female; PF Probably Female; M Male; PM Probably Male; U Unknown

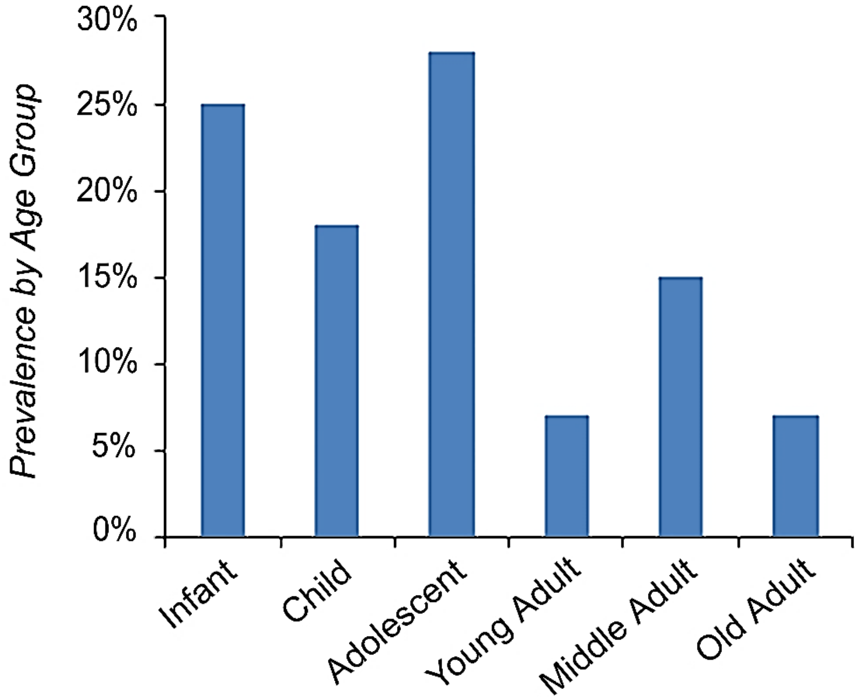


Fig. 6.7: The distribution of P3WR individuals by age group.

Evaluation of the sex of Pueblo III remains is even more compromised than determinations of age. Among primary burials, females outnumber males at an unbalanced ratio of 7:3. The inclusion of data from three of the ISE os coxae reported in Table 6.10 provides a somewhat more balanced result, in which 61% (8/13) of individuals are females and 39% (5/13) are males. The condition of os coxae 18.5.790 is insufficient for appraisal using pubic development criteria or DSP measurement (Mureil et al., 2005) but robust landmarks suggest that this is also a male. If so, then the female:male ratio of 8:6 (43% v 57%), is essentially balanced. Considering the bias caused by scavenging carnivores, this is not a meaningful difference. However, there is a distinct discrepancy among adolescents whose sex is determined: five of six individuals, or 83%, are females; moreover, only one (HR 17) is a probable female. Interestingly, most (5) of the females are adolescents, compared to one young adult and one elderly female. There are no Middle Adult females but 75% (3) of the males are 35-50 years of age. Just one male each represents the Adolescent and Young Adult age groups.

6.4 Human Skeletal Remains: Interpretive

6.4.1 PRIMARY BURIAL DEPOSITS

The criteria used to identify a total of 21 individuals as a primary burial deposit at Wallace Ruin are provided in Table 6.12. The Anatomical Organisation category comprises the sub-categories of labile connections, persistent connections, and ordered arrangement. To review, labile connections involve small bones joined by weak connective tissues that break down rapidly after death. These anatomical relationships pertain to hand bones, distal foot or forefoot (metatarsals and phalanges), the scapula-thoracic junction and the femur-acetabulum joint (Duday and Guillon, 2007:121,127). The presence of intact labile connections is widely viewed as the most salient factor for a determination of a primary burial deposit. Persistent connections involve joints bound by thick, strong connective tissues which are more resistant to decay. Such articulations include the occipital-atlanto (occipital condyles and C1) joint, knee, ankle, tarsals, lumbar vertebrae, and the sacro-iliac joint corpse (Ibid.). Ordered arrangement pertains to the second part of Duday's (2006:14) definition of a primary burial in that it refers to the deliberate, patterned, or orderly, placement of the body. The sub-categories regarding material evidence are either self-explanatory or are described when relevant.

Table 6.12: Evidence for the designation of a primary burial deposit for Wallace Ruin individuals represented by both cranial and infra-cranial bones.

Indiv.	Anatomic Organisation			Material Evidence			Primary Burial
	Labile Connections	Persistent Connections	Ordered Composition	Shrouding /Mats	Grave Goods	Architect. Feature	
HR 1	✓	✓	✓			✓	✓
HR 2	✓	✓	✓				✓
HR 3	✓	✓	✓	✓	✓		✓
HR 4	✓	✓	✓	✓			✓
HR 5	✓	✓	✓		✓		✓
HR 6	✓	✓	✓		✓		✓
HR 7	✓	✓	✓				✓
HR 8	✓	✓	✓				✓
HR 9	✓	✓	✓		✓	✓	✓
HR 10	✓	✓	✓	✓	✓		✓
HR 11	✓	✓	✓		✓	✓	✓
HR 12			?				probable
HR 13	✓	✓	✓			✓	✓
HR 14	✓	✓	✓			✓	✓
HR 15	✓	✓	✓				✓
HR 17	✓	✓	✓		✓		✓
iLNK 326[a]			✓		✓		probable
iLNK 366							?
iLNK 835				✓	?		probable
iLNK 836				✓	?		probable
iLNK 867				✓	?		probable

[a] secondary mortuary treatment

The degree of skeletal integrity could have bearing on interpretation of evidence for delay in corpse disposal, particularly regarding labile connections. Unfortunately, the often significant displacements of small to large bones by burrowing animals, including between rooms, is a recurrent circumstance in the great house and midden. As can be seen in the Figure 6.1 plan of Room 17a mortuary contexts provided in Section 6.2.1.1, many dis-associated bones from infant HR 2 were recovered in an animal burrow. Moreover, several vertebral laminae were located within the adjacent, intact cranium of HR 3. These bones were intermingled with those from HR 3, HR 5 and at least one more infant of about the same age. This taphonomic factor admittedly complicates interpretations of whether missing bones are the result of post-depositional disturbances or the product of a delayed mortuary deposit, in which the phalanges become separated during putrefaction prior to deposition. For several individuals, it was possible to re-associate bones from the hands or feet to a specific individual, in which case this type of connection is scored as present.

Most of the Wallace Ruin primary burials are classified as such from multiple criteria. Of those identified by the HR designation, only late-term foetus/neonate HR 12 has no evidence of labile or persistent connections since the requisite skeletal remains were not recovered despite the use of a fine-screen. Rather than individually point-located on the field map, the locations of these tiny bones were plotted within a small oval. Nevertheless, those bones recovered are from the cranial and its adjacent thoracic region and thus in close anatomic relation. This, in concert with the small dimension of the mapped locus is suggestive of an *in situ* deposit rather than a re-deposit of disturbed bones. As there is no counterevidence, this individual is deemed a probable primary burial. The identification of the disordered bones of iLink 366 is construed as a possible primary burial. This determination is based upon the representation of many tiny, fragile elements from multiple skeletal regions, in combination with the occurrence of most of these bones within Stratum 5 of Room 15b. In contrast to the other iLinks, the absence of material mortuary evidence renders this designation less certain.

Accordingly, a designation of an ordered arrangement is possible for all individuals in the table above except for HR 12 and iLinks 366, 835, 836 and 867. Even though the skeletons of HR 4 and HR 11 were disturbed and bones removed during post-deposition intrusions, the positioning of the forearms and/or lower limbs are consistent with the ordered arrangements observed in other P3WR primary burials. The singular re-deposit context of iLink 326 merits classification as an ordered arrangement in respect to her secondary mortuary treatment.

6.4.2 SECONDARY MORTUARY TREATMENT

Bradley's (1988) use of the term secondary burial is consistent with Southwest archaeology usage, as it is frequently applied to any intentional relocations, or re-deposits, of bones by humans, and as such, does not necessarily imply additional mortuary rites. Marden (2011:182) advises that this usage is incorrect and can be a source of confusion since the deliberate relocation of bones can be part of a multi-component mortuary program. As proposed by Hertz in 1907 (cited in Metcalf and Huntington, 1991: 33-38) the term secondary burial specifically refers to a subsequent stage of a multi-component mortuary ritual that represents “rites of passage” which separate the living from the dead, as subsequently proposed by van Gennep in 1909 (1960). In cultures in which death is perceived as a process in which the individual passes through a sequence of stages rather than an instantaneous event, mortuary actions likewise mirror these stages. The actions taken are variable between groups since they are founded on metaphors related to concepts of afterlife. Even so, in the case studies of Hertz, the first stage typically ends after skeletisation, at which point bones are removed, re-located, or re-deposited elsewhere.

Hertz uses examples from southeast Asia, but Ubelaker (1974) provides a North American (Virginia) example of secondary burial in respect to significant concentrations of commingled bones found within two large burial pits, or ossuaries. Although he does not address possible symbolic underpinnings, Ubelaker (Ibid.:8-11) interprets the results of his osteological analyses in terms of ethno-historic evidence of an indigenous three-stage mortuary program still pervasive in the Southeast US in the 17th and 18th centuries, albeit with local variations. Common to these accounts, a body was first stored in a “death house” or on a scaffold until the onset of the next periodic, communal re-deposition rite. At that point, soft tissues adherent to the bones of all individuals who had died since the prior ceremony were, more or less, removed during “bone cleaning” conducted by relatives or itinerant specialists. In the final stage, bones were distributed among relatives, or, as in the Virginia sites, selected bones were deposited in a communal ossuary.

Ancestral Puebloans removed all but the lower limbs of HR 11 from the subfloor burial pit and then re-deposited most of them within this pit. Whether this action represents a secondary mortuary treatment is open to question. On the other hand, human agency alone accounts for the presence of 852 commingled bones and teeth within the North Suite’s ground-storey rooms. All known passageways are identified in the Figure 6.8 plan. Stratigraphic analysis shows that these elements were not deliberately overlain with sediments or cultural fill.

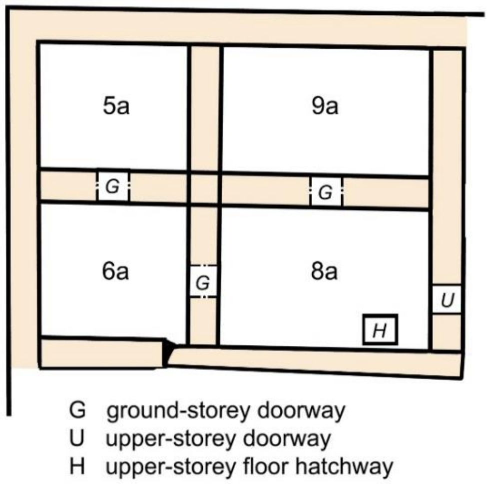


Fig. 6.8: Plan of passageways into and within the ground-storey rooms of the North Suite of Wallace Ruin.

No doorways were constructed within the ground-storey's exterior walls or in an interior wall shared with a room adjacent to this suite. The only exterior doorway in the upper-storey is within the east wall of Room 8b. Whether roof hatchways were present is unknown, but intact (6b) or partial (5a, 8a) upper-storey flooring materials indicate that the 8b/8a hatchway provided the only passageway to the ground-storey rooms. Significantly, the hatchway cover was still in place at discovery (See Figure A.19, App. A). Moreover, intrusions by canids can be ruled out with confidence since entry into Room 8a and thus the other ground-storey rooms required a ladder.

Therefore, regardless of their original place of deposition, the intentional movement of bones from one place to another within a site by humans is consistent with Marden's (2011) definition of a secondary mortuary treatment. Accordingly, Bradley's use of the term *secondary burial* for the North Suite bones is technically inaccurate, given that the evidence indicates an *ad hoc* response to crisis with scant evidence for additional mortuary observances.

A reasonable case could be made that the bones allocated to the adolescent female iLink 326 represent such practices even if not secondary burial as defined by Hertz. The two photographs in Figure 6.9 document the location and orientations of several re-deposited bones in the southeast corner of Room 5a, on the sloping floor. The scapulae and upper limb bones, clearly positioned to mimic some semblance of anatomic order, are overlain with a shaped sandstone slab; it is not a building stone so cannot be confused with wall fall. Whether the ribs are from iLink 326 is unknown.

Fig. 6.9: Field photographs of the structured re-deposit of skeletonised bones of iLink 326, North Suite Room 5a, Wallace Ruin. Left: “torso” is directly overlain by a shaped sandstone slab; (Right) overlying slab removed. Photographs by Bruce Bradley.

The cranium and the adjacent articulated cervical vertebrae unit are out of “anatomic position” relative to the arranged bones under the slab. Both may be in their re-deposit context, but another possibility is that the cranium was positioned “superior” to the scapulae and upon an organic substance, such as a blanket. Eventually, the cranium, somewhat round owing to its pronounced artificial deformation, could have rolled into its discovered location once this material disintegrated, even dragging along this section of articulated cervical vertebrae. In addition to the disparity between this arrangement and all other re-deposited bones in this room, which is documented in Figure 6.10 below, the covering of upper body bones with a shaped stone slab also speaks to the distinct impression of a structured re-deposition involving some rites, if only on a personal level. The positioning of such a slab over the corpse is sufficiently common in MVR sites that “Moki digging” pot collectors located midden burials by striking such slabs with metal probes (rebar) thrust through softer overlying deposits.

6.4.2.1 *Delayed deposit as a secondary mortuary treatment?*

Though the persistence of labile connections generally indicative of *in situ* decomposition within days of death, the logistical circumstances pertaining to use of Wallace Ruin as a mortuary facility add additional layers of complexity. Potentially, some skeletons classed as *in situ* remains may in fact represent a delayed, or second, disposal due to extremely adverse winter conditions. Duday and Gillion (2007:126) address this complication in respect to temporary storage of the corpse within snow, which they do not equate with a primary deposit. Accordingly, such delays are not equivalent to secondary burial, which is part of planned multi-component mortuary program. Rather, this scenario is akin to the prolonged storage of bodies in modern mortuary facilities for logistical/legal reasons, in which case such temporary measure is not construed as part of mortuary ritual. This is not to say that logistical difficulties would have taken precedence over Ancestral Pueblo socio-ritual requirements for a prompt and final deposition; rather, the discussion that follows presents a hypothetical consideration.

According to the information provided in Chapter 3, the nearest Pueblo III residences were some 8 to 9 km (5 miles) distant, there were no established roads, transportation was by foot, and there were no domestic animals larger than dogs to assist with movement of a medium or large-sized corpse. Although farming conditions between AD 1180 and 1220 were generally favourable, climate reconstructions suggest that winter and early spring weather could be severe in terms of daytime subfreezing temperatures. Blizzard conditions involving high winds, large accumulations of snowfall and deep snow drifts would not have been a rare occurrence.

The shift to surface rooms as mortuary locations in many Pueblo III residential sites means that the temporary placement of a corpse in such locations may have been open to consideration. Assuming climatic factors, the corpse would be subjected to freezing temperatures, in which case decomposition would likely have been delayed or stalled (Duday and Guillon, 2007:126; Micozzi, 1996). Moreover, material evidence of shrouding and woven willow mats suggests that some or all P3WR corpses were wrapped at deposit within Wallace Ruin. From the anatomic displacements of hands (HR 3) and feet (HR 6) and elevations of the clavicle (HR3, HR 10) it seems that cadavers were fully and tightly wrapped with cotton shrouding, and perhaps layered with additional organic materials of various kinds. Thus, the use of close-fitting wrappings may have maintained anatomic position of bones until eventual deposit at Wallace Ruin, regardless of whether soft tissues forming labile connections had begun to deteriorate. However, the prospects are that delay in disposal due to severely cold weather would be undetectable in terms of labile anatomic connections, assuming temporary disposal within a frigid surface room and shrouding. It could be argued that the disruption of these connections would more likely occur if the "temporary" stage included interment in any subsurface location, either with or without shrouding.

The survival of both labile and persistent connections would be unlikely if a delay was extended and freezing conditions were not operative; presumably more-so if the temporary locus involved a damp subsurface location. As discussed below, displacements involving persistent joints in P3WR skeletons conform to patterns commonly interpreted as representing corpse decomposition in a void. Thus, the maintenance of most persistent connections indicates that corpses were disposed of at Wallace Ruin shortly after death, allowing for some delay during extremely cold conditions. The nearly intact status of most anatomic connections means that P3WR depositions did not include decomposing corpses transported following a prolonged "temporary" storage.

All in all, the primary obstacle to evaluating the potential for delayed disposal is post-deposition disturbance by burrowing animals. Conceivably, a corpse may have arrived with intact anatomic connections after a temporary disposition only to have labile connections disrupted after deposit at Wallace Ruin. The parsimonious explanation is that the loss of hand and foot labile connections in P3WR *in situ* burials reflects post-deposition conditions within the great house. The possibility of a short delay between death during extreme weather conditions and deposit at Wallace Ruin cannot be ruled out. Even if so, the eventual deposit of a corpse at Wallace Ruin due to logistical considerations does not constitute secondary mortuary treatment. The conclusion here is that P3WR skeletons with multiple articulated anatomic units represent *in situ* primary burial of intact bodies deposited shortly after the time of death. This evidence also serves to demonstrate that no bones (apart from digits, potentially) were removed from a corpse prior to its conveyance to Wallace Ruin.

6.4.2.2 *Identification of carnivore-disturbed primary burial contexts*

In view of the distribution of the Room 18a and Room 5a bones that are mapped in Figure 6.10, the disordered states of these commingled skeletal deposits are hardly distinctive from each other. Not all bones were mapped but the major ones are point-located. One would be hard-pressed to ascertain the arrangements produced by, presumably, canids (Room 18a) versus humans (Room 5a). The question then is whether there is any evidence to support the interpretation that room served as a locus for primary burial, or if the bones in disarray probably represent the re-deposition of bones from primary burials located elsewhere.

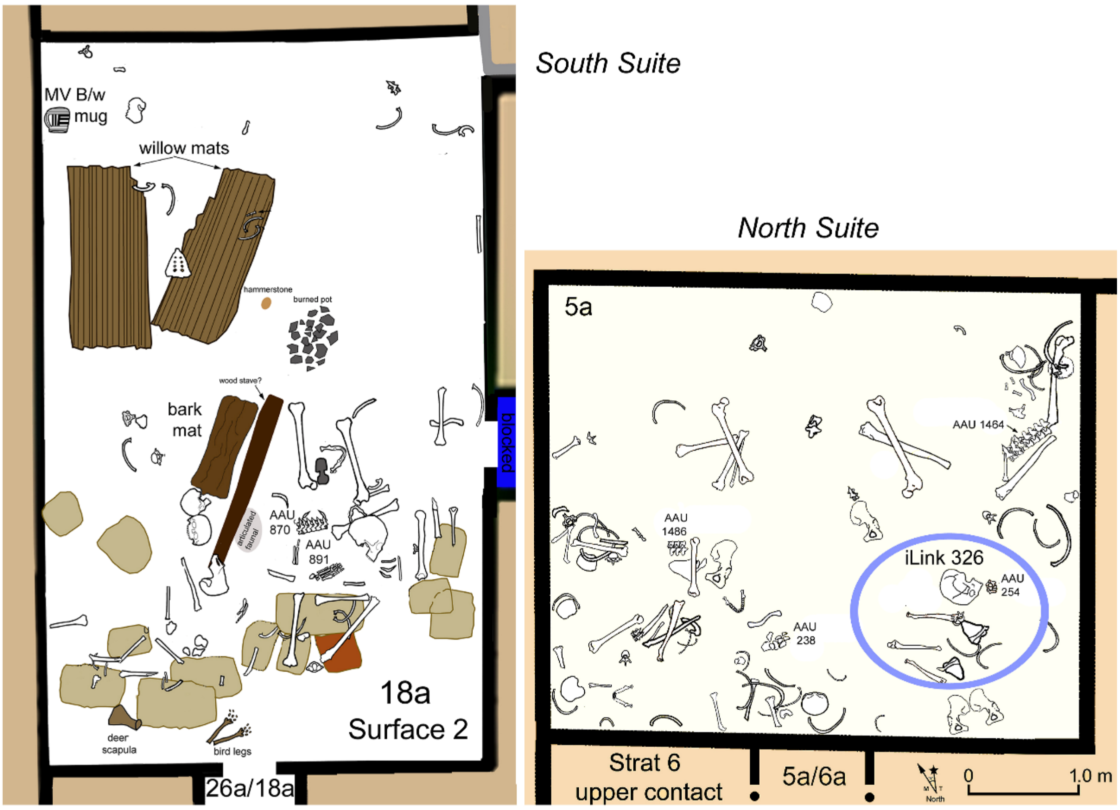


Fig. 6.10: Comparison of the distribution of bones following disturbance by scavenging carnivores in South Suite Room 18a and the re-deposition of similarly damaged bones in North Suite Room 5a by Ancestral Puebloans. Note also iLink 326 bones in the southeast corner of Room 5a.

Three expectations are offered here to distinguish these possibilities. The first is that an individual, or Individual Link, is represented by numerous bones from multiple skeletal regions. Considering that digits can be readily consumed or destroyed by canids, Andrews and Bello's (2006) stipulation that phalanges in general, and terminal phalanges, specifically, must be present for diagnosis of a primary burial deposit is unsafe in these circumstances. The second stipulation is that skeletal trauma must be consistent with that created by canid biting or gnawing, as opposed to the linear, groove or percussion injuries inflicted by humans (Ubelaker and Montaperto, 2014; Villa and Mahieu, 1991; White, 1992: 143-156). The third requirement is that a room must contain other indications of a mortuary locus, such as mats, shrouds, or ceramic vessels.

Applying these criteria to the two South Suite rooms were disturbed primary burial deposits are postulated, only Room 18a contains skeletal remains that can be construed as primary burial deposits. Although a minimum of five individuals in Room 18a are represented by skeletal elements, the combination of criteria noted above allows an interpretation of a primary burial deposit for Individual Links 835, 836 and 867. Likewise, the presence of a willow mat in Room 26a suggests the presence of at least one disturbed primary burial deposit on Surf 2a; primary burial HR 10 was deposited upon the slightly lower Surf 2b and was undisturbed by scavenging animals. Three tibiae from two adolescents or adults and one child, plus an unfused occipital *pars squama* from an infant could mean that a minimum of four individuals were deposited upon Surf 2a/Room 26a. However, no individual is sufficiently represented by skeletal elements to merit designation as an Individual Link. Even so, the poor evidence for the primary burial deposits makes sense if the T-shaped doorway on the south, exterior wall of Room 26a served as the entry point into the South Suite. This large, ground-level passageway would have provided both easy access to cadavers and an uncomplicated means to remove shrouds, mats, and human remains from the building. This doorway was blocked with masonry when located during research excavation. The likelihood is that it was permanently blocked in response to this intrusion since there was no other accessible ground-storey entrance into the South Suite by the time of this event, and the only other exterior doorway is located on the upper-storey of the east wall of Room 19b; however, this and the intervening doorways in the east and south walls of Room 19b were formally blocked when discovered. Another possibility is that associated organic materials were used to gather up disturbed remains and they simply did not survive in the depositional environment of the North Suite.

6.4.3 MORTUARY CONTEXT TYPE (MCT) ALLOCATIONS

This consideration of mortuary context type determinations focuses upon observed or inferred primary burial deposits even though the number and preservation of skeletal elements indicates that numerous Pueblo III corpses were deposited within the great house. Their occurrence in respect to the 10 Mesa Verde Region mortuary context types defined in Chapter 4 are specified in Table 6.13. In this study of MCT locations, the term *structure* refers to a single architectural unit such as a kiva or pit-house. At Wallace Ruin, the only such units are kivas, which is the designation used in this chapter since B. Bradley (1988; 2010) also applies this term to a set of multi-storey rooms.

Table 6.13: The distribution of Mesa Verde Region mortuary context types at Wallace Ruin, by chronological period and number of primary burial deposits.

	Surface Room			*Structure (Kiva)*				*Extramural*		
Period	Fill	Floor	Subfloor	Fill	Floor	Subfloor	O. Arch.	Stor. F.	Grave	Midden
Pueblo II	1	3	1	U	U	U	U	U	U	1
Pueblo III[a]		11	3					U	U	
PIII/Numic	1							U	U	

[a] includes iLink 326 secondary mortuary treatment; U unknown

Of the 21 individuals classed as an observed or inferred primary burial, six are Pueblo II in age, 13 are Pueblo III and one is either very late Pueblo III or possibly Numic. Observed MCT are limited to surface rooms or the extra-mural midden, but this restricted use of MCT types may be more apparent than actual. No Pueblo II kiva has been excavated, but it is certain that none of the three Pueblo III kivas were used as a mortuary locus. Just two bones are associated with Kiva 1; both are presumably Pueblo III in origin and each is in a location suggestive of movement from elsewhere by burrowing animals. Few areas outside of the great house have been excavated, so it is unknown if exterior storage features or burial pits (graves) are present as well. Given the high water table at Wallace Ruin, the chances are good that the ubiquitous Pueblo II bell-shaped storage pits were never constructed at this site.

Primary depositions occur as room and extra-mural midden MCT during the Pueblo II Period. The count of MCT types and number of individuals within the West Arm is secure, considering that subfloor excavation was a common procedure. The evidence from the midden is an underestimate, as implied by the occurrence of disturbed remains from at least four more individuals. If these remains are counted, then the distribution between intra-mural and extra-mural MCT is almost balanced. Only one corpse (iLink 366) may have been placed within room fill deposit situated just above the upper-storey floor. However, the original locus is uncertain since Room 15b strata were mixed during the construction of the Pueblo III Kiva 1. This mortuary locus is allocated to the floor fill MCT since most of the bones are in fill strata; however, the possibility that iLink 366 was deposited on the upper-storey floor cannot be excluded.

Each of the 13 Pueblo III remains is situated in a Room MCT. The large majority rest upon a floor comprised of prepared adobe or a Pueblo III use-surface. Despite uncertainty regarding the exact horizontal proveniences of the three iLInks in South Suite Room 18a, the skeletal and matting evidence is conclusive that each was deposited upon the Pueblo III use-surface. The re-deposited and re-assembled bones of iLink 326 are on a Pueblo III use surface of North Suite Room 5a. Three individuals are in subfloor locations but just two burial pits are present since one contains a double-burial. Significant to this study, no Pueblo III corpse was deposited within any type of fill stratum.

No structure has a primary burial deposit on both an upper-storey (b) and a ground-storey (a) floor. Structure 9 is the only structure in which the occurrence of human remains in both stories is associated with human intent: the re-deposited ISE on floor fill of Room 9a and a primary burial in Room 9b wall fall. Infant HR 1 is located near the apex of a series of strata comprised of masonry rubble originating from the collapse of all four upper-storey walls. Even if HR 1 is Pueblo III in age, the two stories of wall fall rubble that the informal burial cyst rests upon are produced by natural processes and thus not equivalent to burial within a cultural fill unit derived from human actions. Whether this was the viewpoint of the buriers is unknown.

The presence of isolated skeletal remains in Structures 2, 14, and 25a are due to the natural movement of bones by animals or, potentially, unintentional human behaviour. The latter is a distinct possibility regarding Structure 7’s ISE given its proximity to the North Suite; some bones may have been accidentally dropped by humans as they transferred bones for re-deposit following the disturbance of South Suite primary burial contexts by carnivores.

6.4.4 TAPHONOMIC EVIDENCE FOR DECOMPOSITION IN A VOID

Both stratigraphic and material culture evidence indicate that no primary burial above the level of an original ground-storey floor surface was deposited within a filled space, that is, interred within or intentionally covered by any type of fill deposit. The evidence is more secure regarding the absence of concentrations of cultural refuse, but whether this was the case for sediments is less certain. The mortuary contexts of HR 5 and HR 6 offer a case in point. Although placed along contiguous walls, each corpse was deposited upon the same Room 17a use-surface (Pueblo III Surface 3). Both skeletons are covered by a fine silty fill unit (Stratum 7) that extends beyond the vicinity of each deposit locus. No archaeological evidence suggests that either corpse was intruded into a pre-existing sediment fill unit, which appears to be the case for two or three primary burials at nearby Ida Jean Pueblo (Brisbin and Brisbin, n.d.). However, this is a remote possibility considering the extensive disturbance by animal burrowing along each of these two walls. Moreover, a burial pit rim is not always discernible in fill units comprised of fine, silty sediments. Conversely, what at first appeared to be the rim of a shallow burial pit for HR 5 is apparently the product of floor subsidence within the area of an underlying animal burrow. Ultimately, archaeological evidence alone regarding burial within a pit or a void space is less than certain.

The displacement of skeletal elements from normal anatomic position during decomposition can establish that deposition occurred in an open space, or void. As explained by Duday (2009:38), “Generally, if a bone is in potential disequilibrium in relation to the space occupied by the body, it will fall into this space when decay of the soft tissue frees it.” By way of example, a corpse deposited on a supine, face-up position in an open space may have bones rotated laterally some 90° by the time of excavation. The question then, what was the orientation at deposition?

Accordingly, this analysis focuses upon selected displacements observed in Pueblo III primary burials from Wallace Ruin, excluding Individual Links. The detailed analysis of such small-scale dislocations as the vertebral column or the digits is rarely possible for those remains, either due to natural post-deposition disturbances or because the requisite information was not recorded during excavation. No individual is assessable for a full range of criteria, but the number and types of categories are usually sufficient to ascertain whether decomposition took place in an open or closed space. Occurrence evidence pertaining to the three fundamental descriptive categories utilised in *anthropologie de terrain* is provided in Table 6.14 as is the Collapsed Upright Knee displacement type advanced in this thesis. Assessments per individual are provided in Appendix B. Visual examples of skeletal displacements associated with decomposition processes are circled in red in the Figure 6.11 field photograph of the mortuary loci of HR 2 and HR 3; the regions disturbed by burrowing animals are highlighted in blue. Additional photographic evidence from Wallace is noted when relevant. All descriptions of skeletal movements are from the perspective of the skeleton.

Table 6.14: Significant skeletal displacements occurring during decomposition in suitable P3WR primary burials.

Indiv.	Joint Space	Axial Rot., U.	Anatomic Unit	Dropped Element	Collapsed Upright Knees
HR 2	A	U	U	A	NA
HR 3	P	P	P	P	P
HR 4	A	A	P	U	P
HR 5	P	P	U	A	?
HR 6	P	A	A	P	P
HR 10	P	P	A	P	P
HR 11	U	U	A	A	NA
HR 13	A	A	A	A	NA
HR 14	A	A	A	P	NA
HR 17	P	A	P	A	P
Total	5	3	3	4	5-6

A absent; P present; U unknown; NA not applicable

At least one displacement type was assessable in the ten P3WR primary burials. Some aspects of the HR 2 and HR 5 evidence is sketchy because both skeletons were disturbed by burrowing animals. Even so, the configuration of HR 2’s ordered bones are consistent with deposit on the right side in a fully flexed postural arrangement. There is no meaningful increase in joint spaces of right limb bones, which are in close anatomic position relative to each other, the pelvis and lumbar vertebrae. Each bone is at the same elevation on the disposal surface, which eliminates the potential for dropped elements. In the case of HR

5, a confident argument cannot be offered regarding the observed versus *in situ* configuration of the lower limbs relative to the ossa coxae. Although the semi-flexed lower limbs may have been in contact with Surface 3 from the outset, the undermining of the deposition surface during burrowing means that shifts in element orientation cannot be assumed as original or the product of decomposition in an open space. The three individuals in subfloor pits (HRs 11, 13, 14) have only one displacement that is attributable to corpse decay among them. In contrast, every one of the five remaining skeletons has several significant bone displacements.

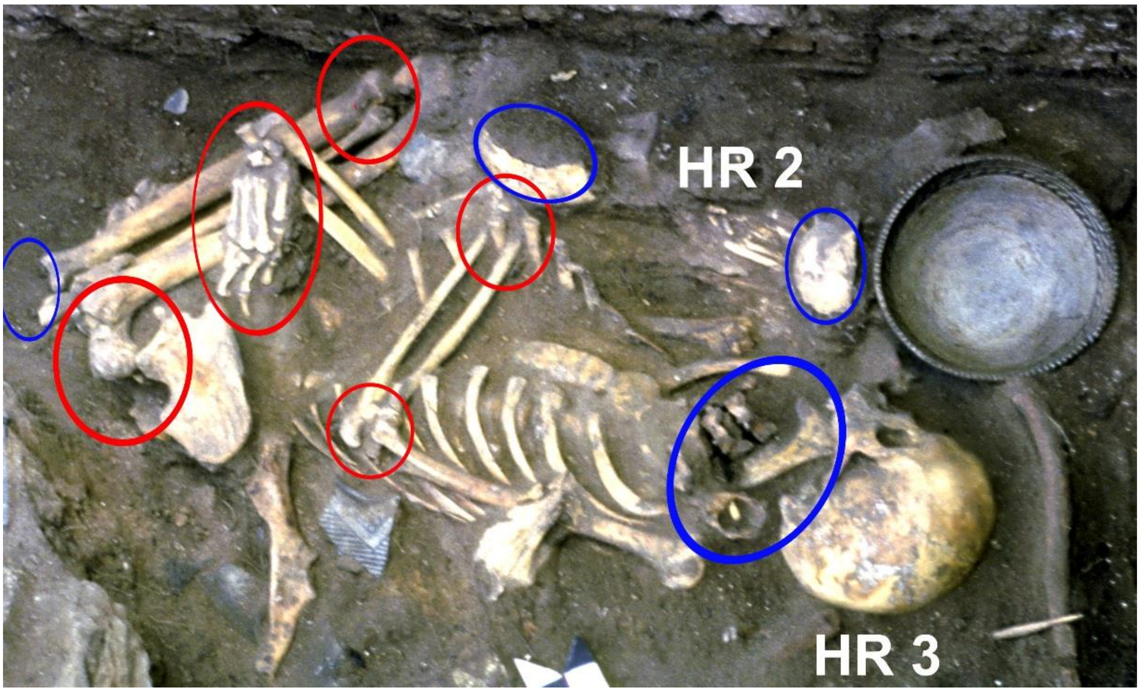


Fig. 6.11: Photograph of selected skeletal displacements of in situ HR 2 and HR 3 of Wallace Ruin's Room 17a, Surface 2. Displacements evidencing decomposition in an open space are circled in red; disruption to anatomic position by animal burrowing in blue.

6.4.4.1 *Increased Joint Space*

Displacements involving joint spaces between long bones are the most readily observed shifts from anatomic position, with five (50%) remains evidencing one or more post-deposition alterations. Possibly, HR 5 could be included among these as well. Such movements involve increased distance between bones forming a persistent joint, sometimes in combination with axial rotation. Five individuals (HRs 3, 4, 5, 10 and 17) evidence increased joint space at an elbow, wrist, knee or ankle. Another common displacement in a void involves an increase in space between the femur head and the acetabulum, even when the corpse is in a supine position (Duday and Guillon, 2007:138). This displacement occurs with HRs 3, 4, 6, 10 and 17. See also Figures 6.14.a, d and f, versus the normal anatomic connections in Fig.6.14h.

As is evident in Figure 6.11 above, the proximal end of the HR 3's left ulna is displaced inferiorly 5-6 cm, close to anatomic position but not in articulation with either the olecranon fossa of the humerus or the tuberosity of the radius. Moreover, there is also increased space within the distal radio-ulnar articulation, another persistent joint: the distal ends of the forearm bones are roughly 5 cm apart and separated by the near-vertical sternal end of an inferior rib.

6.4.4.2 *Axial Rotation-Upper Limbs*

The left ulnae of HRs 3, 5 and 10 evidence axial rotation (Figs.6.11 and 6.14e). Those of HR 5 and 10 are rotated 90° whereas HR 3's left ulna evidences a more moderate alteration of 15 degrees. However, in living individuals or a fresh corpse, any rotation within the elbow joint is non-anatomic since this hinge socket limits movements (flexion and extension) to the sagittal plane. Even when allowing for a few degrees in change of angle for skeletal remains, all three ulnae, which are also displaced inferiorly, are firmly beyond normal Range of Motion (ROM). In addition, the adjacent left radius of HR 3 evidences internal rotation of 120 degrees, which exceeds both normal (80°) and maximum (90°) ROM. The potential for rotation along an axis cannot be evaluated for HR 2 since this level of detail was not recorded in the field and cannot be ascertained from field photographs.

6.4.4.3 *Displacement of an Anatomic Unit*

Excluding lower limbs, three skeletons evidence the movement of an anatomic unit in which multiple elements were still connected by soft tissues. Both HR 4 (Fig. 6.14b) and HR 17 have additional space between a long bone and an articulated hand or foot. In the former, the complete *in situ* left foot retained full contact with the disposal surface when the upright tibia was forced downwards and to the left upon collapse of the upper-storey floor. The tibia is at an unmeasured but very acute angle relative to the foot, and the distal articular end is in close anatomic position but not in articulation with the talus. In the case of HR 17, the right scaphoid, capitate, pisiform and trapezium are in anatomic position in relation to each other. Although they are in close anatomic position relative to the distal ends of the radius and ulna, this carpal unit rests directly upon the disposal surface, which is at a lower elevation than the forearm.

The most obvious case involves the right hand of HR 3, which revolved approximately 180° while remaining in near or approximate anatomic position. This displacement is circled in the Figure 6.11 photograph above. Five carpals are missing but all hand bones are present and many are in anatomic position. The bones are displaced as a unit; the metacarpals are at an oblique angle relative to the shaft of the left femur; i.e., rather than lying medially, the palm-down Ray 1 (thumb) is lateral. The carpals and metacarpals rest upon a thin layer of fine sediment fill that separates them from the underlying lateral surface of the femur midshaft. The generally articulated phalanges, which are in extension, are angled downwards towards the pelvic cavity at a steep (approx. 45°) angle.

Most labile joints are intact even though the hand bones are not in a natural position. The integrity of the metacarpal and phalangeal articulations, especially when combined with the supine positioning of the forearm, suggests that the medio-lateral displacement of the hand is due to gravitational forces during decomposition. The bones may well have slumped as a unit during or after the breakdown of the extensors and radio-carpal ligaments. Standard anatomic position of the supine hand would have entailed metacarpals palm-up (Ray 1 lateral) in extension, fingers extended or curled. If this had been the case, the wrist and hand bones would have slumped inferiorly to the left femur during decomposition. It seems that at the time of corpse disposal some organic material, probably a shroud, held the hand in a near vertical position. The dirt beneath the hand bones, absent from the forearm-femur contact, indicates that this alteration from the original position occurred after a thin layer of sediment had covered the inferior region of the corpse. Given the presence of many undisturbed labile connections, rodent disturbance seems unlikely. The nature of the displacement indicates decomposition in an open space.

6.4.4.4 *Dropped Element*

Four individuals have a single bone or anatomic unit that has dropped in elevation from anatomic position. As can be seen in Figure 6.11 above, both HR 3 distal forearm shafts project 3-4 cm through the space between the upright sternal ends of right ribs 8 and 9 (or 9 and 10) at a level roughly 2 cm below the sternal end of these ribs. This intrusion into the intercostal space involves both an increase in joint space within the wrist and a circumstance akin to a dropped element. In this case, the intrusion of the long bone ends into intercostal spaces of the thoracic cavity is a clear example of a gravity-based displacement into an empty body cavity during soft tissue decomposition in a void (Duday 2006, 41; 2009, 34) In contrast to rapidly decaying costal ligaments (Duday, 2009:52), the muscle, ligaments and interosseous membrane of the forearm would have taken much longer to decompose.

Duday (2009:35) emphasises the importance of recording the exact position of the patella since its location beneath anatomic position is a reliable indicator of decomposition in an open space. At Wallace Ruin, only HR 6 has a dropped patella. This displacement is visible in Figure 6.13a, despite the admittedly grainy quality of the image. However, the utility of this indicator may be limited there since there is a good possibility that many of these bones were held in place by shrouding. Both skeletal and archaeological evidence indicate that HR 4 was deposited on his back with knees in an upright position. Per Duday (2009:34), when a corpse decays in this position the patellae will slide down the tibia within a viscous mass. The woven cotton that covered both knees (Fig. 6.3), including the left patella (Fig. 6.12) seemingly held both patellae in place throughout decomposition, even after both knees were pushed down and to the left when the burning upper-storey floor (17b) collapsed into the central region of Room 17a.

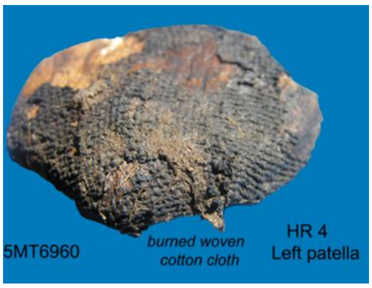


Fig. 6.12: Burned cotton cloth adhering to the left patella of HR 4.

Three individuals have mandibles in which the spaces between dental arcades exceed the possibility of normal anatomic position. Both HR 6 and HR 10 have mandibles that rest directly upon the disposal surface. The mandible of HR 6 is perhaps within the bounds for a determination of anatomic position, but it must be kept in mind that although the bones were buffered by a thick layer of overlying silty fill, the anterior cranium was compressed and fractured by the weight of the east wall when it collapsed onto the east half of Room 17a. Only one bone from a subfloor burial has shifted from anatomic position during decomposition, a circumstance consistent with interment in fill, or a closed space. All skeletal elements of HR 14 are in anatomic position except for her dropped mandible. This incongruity suggests that she may have been wrapped in a willow mat or feather blanket which provided a barrier to rapid in-filling of overlying sediments in this region of the corpse, thus allowing the mandible to drop during the initial stages of decomposition.

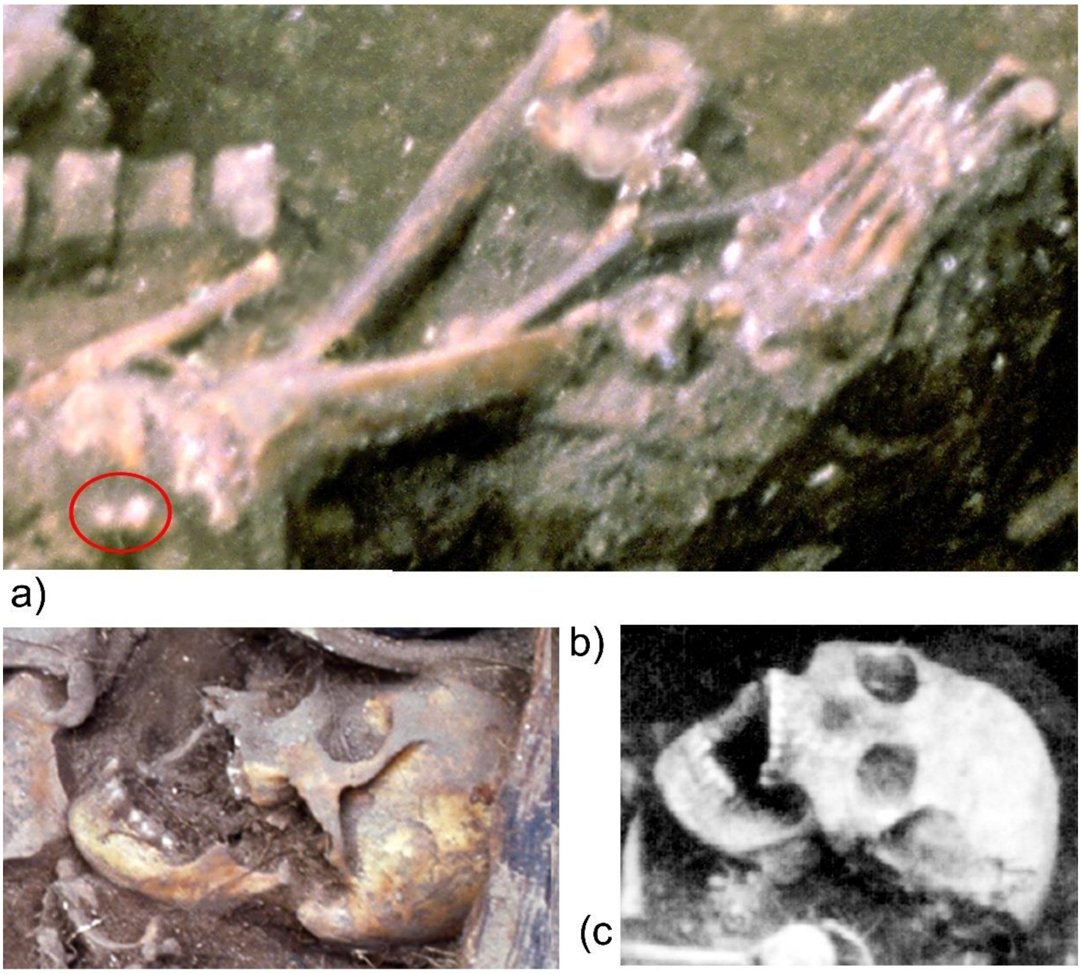


Fig. 6.13: Field photographs of dropped elements in P3WR individuals: a) HR 6, dropped left patella (circled); b) HR 10, dropped mandible; c) HR 14, dropped mandible. Photographs by Bruce Bradley.

6.4.4.5 *Range of Motion: Collapsed Upright Knees*

The collapse of knees from an upright position entails the characteristics of a dropped element and the displacement of an anatomic unit. The results of the range of motion analysis (ROM) to lower limb joint angles, using the method fully described in Chapter 4, are provided below in Table 6.15 for nine Pueblo III primary burials. Photographs of the lower limbs for each of these individuals are compiled in Figure 6.14. Skeletal displacements associated with corpse decomposition for the supine individuals are specified in the map sections that accompany each photograph (Figs.6.14a-h). Bone re-locations from anatomic position caused by animal burrowing or structure collapse are identified in the more detailed maps provided in each mortuary biography (Appendix B). HR 2 is excluded as there are no standards for an individual of this age.

Table 6.15: Lower limb range of motion (ROM) angles for P3WR primary burials. All torsos are supine except for the three with Italicised results, who present laterally. Red font designates non-anatomic angles.

	Lower Limb, Thigh										*Knee*	
	HF/EoK		AB		AD		ER		IR		FLX	
HR	**L**	**R**	**L**	**R**	**L**	**R**	**L**	**R**	**L**	**R**	**L**	**R**
3	175	180		145	110			90	90		160	160
4	180	180		65	80			90	90		150	155
5	175	180		55	70e		NA	90	NA		145e	155
6	170	175		175	120			90	180		180	180
10	175	180		150	115		90		90		U	170
17	180	180	105			95	170		170		160	145-160
11	*0*	*5*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*NA*	*130*	*U*
13	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*145*	*140*
14	*5e*	*20e*	*0*	*20e*	*5*	*0*	*0*	*5*	*45*	*0*	*125*	*130*
Max.	150; 120 av.		55		45		55		50		160; 145 av.	

all measurements are close approximations (~); Max. Maximum normal ROM
HF/EoK Hip Flexion/Elevation of Knee; AB abduction; AD adduction;
ER external rotation; IR internal rotation; FLX flexion

It is evident from these measurements that lower limb joint angles are exceedingly abnormal for every individual with a supine torso. In marked contrast, the three individuals who were deposited on the side have normal ROM measurements for every variable. A pertinent point is that the three lateral depositions are in subfloor pits (Figs. 6.14g, h) whereas those with supine torsos rest upon a floor or use surface.

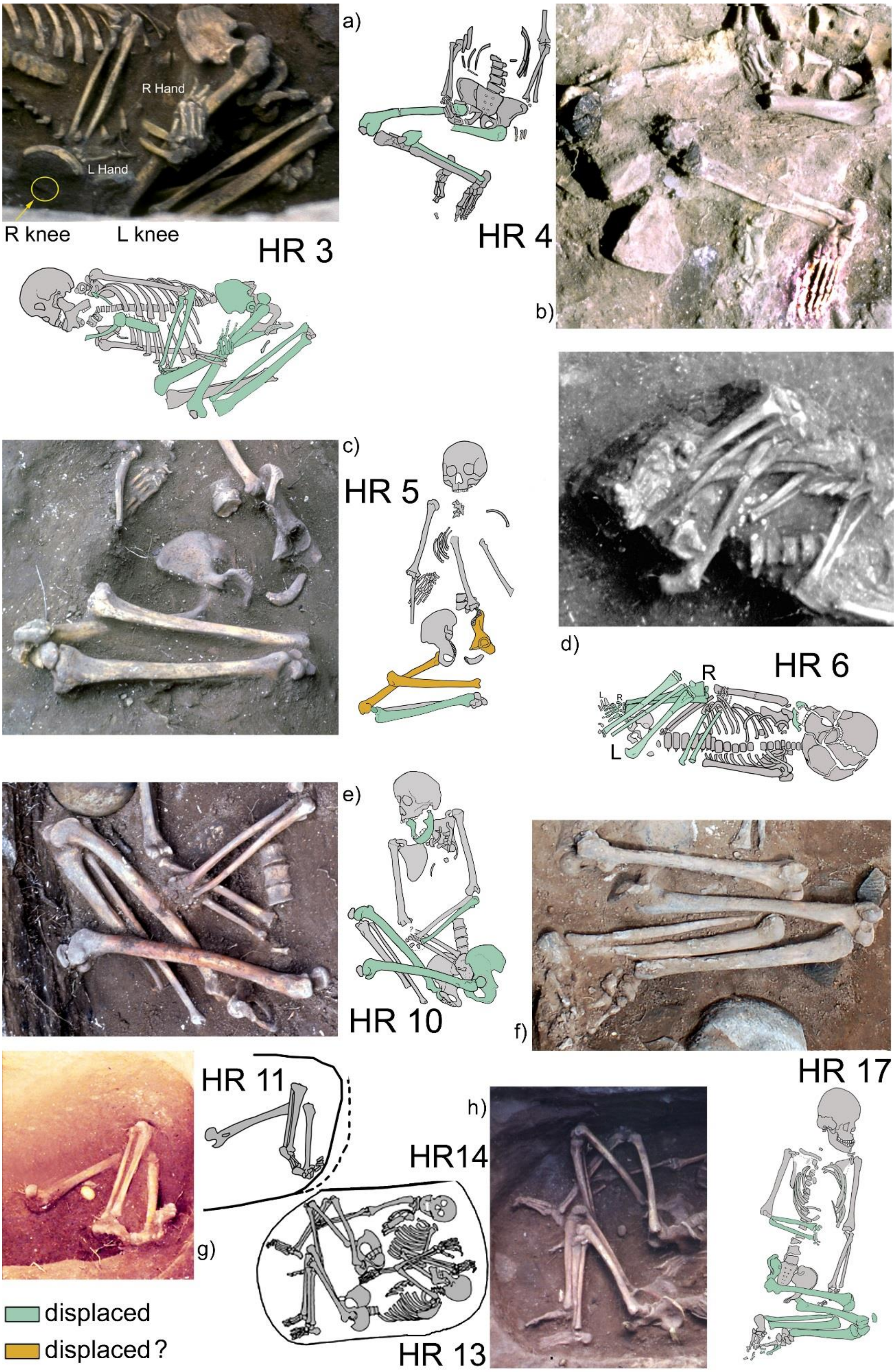


Fig. 6.14: Field photographs and map excerpts of the discovered lower limb configurations of nine P3WR primary burials. Bones displaced during corpse decomposition are highlighted in the accompanying drawings. The torsos in Figs 6.14a-f are supine; those in Figs. 6.14g-h are positioned laterally.

HR 5 has just one or two measurements that are, barely, within normal ROM: abduction of the right femur and the estimated angle of left knee flexion. Thus, if the torso was fully supine angle arrays for both limbs indicate that their observed configurations do not represent their postural arrangement at deposit. The extent of open space within the right knee joint (Fig.6.14c) suggests a post-deposition alteration during or after decomposition. However, it cannot be ruled out that the lower torso was skewed to the right, with knees flexed to the right and on or just above the disposal surface. If so, most of her angles are within normal ROM. It is thus uncertain whether the lower limb positions entail any significant post-deposit alterations; if they did occur, it is impossible to determine whether they represent changes during decomposition in an open space or the effects of burrowing animals on bones within fill.

A crucial point is that a lateral, medial, or anterior surface of every femoral condyle is on just above the disposal surface. For depositions on the back, this equates to the movement of the knee through an approximate 180 degree arc and thus a drop in elevation during decomposition. For lateral depositions, medial or lateral condylar surfaces rest upon or slightly above the disposal surface from the outset and thus hip flexion/elevation of knee angles are at or close to zero. Excepting the three in subfloor pits, knee flexion is close to or exceeds the absolute physiological maximum of 160° (Pinskerova et al., 2009:833). Abduction (lateral) and adduction (medial) of the femora are generally well beyond movements that can occur in a living person or fresh cadaver, as are femoral rotations. The 180° or so rotations pertaining to HR 17's femora and the right femur of HR 6 are particularly noteworthy as they exceed maximum ROM by some 130 degrees. Most of their leg bones are in anatomic position relative to each other and to the adjacent femur, except for the left tibia and fibula of HR 6. Both are externally rotated some 90 degrees; such movements are impossible in a living person or fresh cadavers since this hinge joint allows flexion and extension within the sagittal plane only.

6.4.4.6 *Interpretation*

Every individual deposited on a Wallace floor except HR 2 has a supine torso, though HR 5 may have been supine/lateral. The fully flexed infant was deposited on the side, as were the three individuals in subfloor pits. The configuration of their lower limbs and observed or inferred foot positions of the six supine floor depositions are consistent with a semi-flexed rather than akimbo or fully flexed postural arrangement. The full arrays of non-anatomic ROM angles for these six individuals provides compelling evidence that lower limb postural arrangements were significantly altered between deposition and discovery. None evidences the pattern of long bone alignments, angles or bone surface presentations occurring in the lateral/semi-flexed, akimbo/supine, or fully flexed/supine arrangements described in Chapter 4. Nor do they match the upright knees/supine postural arrangement of an individual deposited within fill. Moreover, a key point is that these limb displacements are bilateral in all cases for those individuals whose torsos are clearly supine. HR 5's circumstances are difficult to assess owing to the effects of animal burrowing within the torso and the undermining of the deposit locus. If supine, her measured angles are beyond normal ROM, but if her lower torso and limbs were skewed to the side like HR 14, joint angles could fall within normal parameters.

At any rate, other than the structure collapse event that altered the positions of HR 4's lower limbs, which is addressed in the Chapter 11, and the possible supine/lateral positioning of HR 5, variations from normal ROM cannot be explained by a straightforward drop in elevation of limbs in a normal anatomic position owing to the weight of overlying fill. Nor do these results suggest that the knees were flexed to the right at an intermediate position above the surface before collapsing into their discovered locations. In such case, the angles of abduction and adduction would be within normal ROM just as they are in the lateral/semi-flexed arrangement. Rather, the variations from ROM are consistent with the significant changes in angles and rotations that occur when semi-flexed lower limbs collapse from a height sufficient to allow the twisting and rotations of a limb, or its elements, before coming to rest upon the disposal surface. This could transpire during decomposition, or possibly even after skeletisation if the bodies were enwrapped with organic coverings that maintained postural arrangements until these materials deteriorated sufficiently. Temperature, insect infestation, corpse wrappings and skeletal damage variables that probably influenced Wallace Ruin decomposition timescales are addressed in Appendix E.

As is also determined from these taphonomic methods pertaining to corpse decomposition, the skeletal evidence is consistent with findings derived using stratigraphic and artefact analyses. That is, those Pueblo III primary burials deposited on Wallace floors/use surfaces were not deliberately overlain by sediments or midden fill. The evidence pertaining to a postural arrangement in which semi-flexed lower limbs with upright knees collapsed into non-anatomic bone surface presentations and in locations upon the disposal surface offers convincing evidence that corpse decomposition took place in open microenvironments. The smaller-scale displacements described above also indicate decomposition in an open space, but the extent of animal burrowing is such that even these could be debated. On the other hand, the displacement patterns pertaining to the lower limb ROM divergences signal significant alterations in the original postural arrangement of large anatomic units, as ascertained from hip and knee ROM variables

In sum, the corpses of HRs 3, 4, 6, 10, and 17 decomposed in an open space during which lower limbs with upright knees collapsed into configurations not possible in a fresh corpse. Accordingly, each is allocated to a room floor MCT. Animal burrowing makes the evidence for HR 5 less certain, as does the deposition of HR 2 on the side. Yet, both are on surfaces upon which one or more assessable skeletons were deposited. It is thus reasonable to assume the consistent application of this mortuary program, especially when considering that there is no evidence to suggest otherwise. Moreover, this mortuary program was in play in the three rooms (17a, 26a, 30a) that contained a relatively undisturbed primary burial deposit on a floor or use surface.

6.5 Scale of Use

6.5.1 NUMBER OF PUEBLO III PRIMARY BURIAL DEPOSITS

The assumption is that all commingled human bones located within the Wallace Ruin great house originated from a primary burial deposited within its rooms. Although it is possible that some bones may have been transported from an exterior location when rooms were deliberately filled with sediments during construction activities, the likelihood is that few would have been introduced in this manner. Certainly, the generally excellent condition of ISE bone surfaces argues against such a scenario.

In such case, a minimum of 32 individuals are associated with a primary burial deposit occurring after AD 1180. However, the shared stratigraphic evidence for

HR 5 and HR 6 indicates that their timeframe may have been somewhat distinct. Although all AMS results overlap within the late 1100s, those for HR 6 indicate deposit prior to 1200 whereas the other four results allow for deposition between 1180 and 1260, though probably prior to 1220. Deposition of HRs 5 and 6 on Surface 3 of Room 17a occurred prior to the accumulation of fill and the deposit of HRs 2, 3 and 4 (and numerous ISE) on Surface 2. Although HRs 5 and 6 clearly predate these 17a remains, the timespan required for the accumulation of the intervening silty fill unit is unknown. Moreover, the sequence of deposit relative to remains in other rooms is also indeterminate due to the lack of additional AMS dates or the overlap in AMS error margins. Potentially, the P3WR deposit sequence could have occurred thusly: Surf 3, Room 17a; other rooms; return to 17a with deposit on Surf 3. Even if HR 5 and HR 6 represent a separate mortuary program, the exclusion of these two individuals means that the scale of use for the second, larger P3WR subgroup is still within the upper twenties.

6.5.2 NUMBER OF ROOMS FOR PRIMARY BURIAL DEPOSITS

Except for Rooms 28 and 29 of the Annex, all rooms within the West Arm are components of multi-storey structures. Nearly three-quarters (72%, 13/18) of these structures have at least one *in situ* or inferred primary burial deposit. The total number of excavated rooms is 32 when including those underlying Kivas 1, 3 and 4. However, due to the accumulation of deep natural or cultural fill units in the Construction Phase 1 and 2 rooms (Old Wallace), only 25 rooms were accessible after AD 1180. The number of suitable rooms may have been nearer to 20 since several upper-storey rooms were heavily burned and had roofs that had either collapsed or were dismantled before or during Pueblo III times. The fifteen Pueblo II or Pueblo III *in situ* or inferred primary burial deposits are in nine (28%) of the maximum 32 excavated rooms. An additional room contains "re-assembled" iLink 326. Although this context is obviously not a primary burial deposit, this re-deposition has mortuary connotations. If all four North Suite rooms with re-deposited human remains are included, then either a primary burial deposit or secondary mortuary treatment entailed the use of 41% (13/32) of excavated rooms and 11/18 (61%) of ground-storey rooms.

The five Pueblo II primary burials deposited in a surface room MCT are in 13% (4/32) of the excavated rooms, for an average of 1.25 burials per room. The ten *in situ* P3WR burials are in five rooms. When the Room 18a iLinks are included, six of the 25 rooms available (19%) were utilized for primary mortuary deposits. The inclusion of the four rooms in the North Suite means that roughly half (40%) of the available rooms, or multi-storey structures (56%), were selected for use as a mortuary locus after AD 1180. One final point to keep in mind is that owing to the paucity of re-associations between the North and South Suites (see Appendix E), Bruce Bradley's (1988) supposition that the North Suite bones originated in South Suite rooms may not be accurate. Potentially, some or all but a very few bones may have come from one or more unexcavated rooms. In such case, the more secure determination is that the six rooms with a Pueblo III primary burial deposit represent the minimum number of rooms used.

6.5.3 NUMBER OF PUEBLO III PRIMARY BURIALS PER ROOM

Determination of the scale of use regarding the number of P3WR primary burials per room is problematic due to the various post-depositional disturbances. An average of 5.3 burials per room is obtained by dividing the P3WR MLNI of 32 by the number of Pueblo III rooms evidencing use as a primary burial mortuary locus (6). However, as noted above, it is not certain that all North Suite elements used in this population estimate came from an excavated room. Using this same method for MLNI determination described above, the South Suite is represented by a minimum of 12 primary burial deposits, which includes the three iLinks of Room 18a. The addition of HR 10 and HR 11 means that a minimum of 14 individuals, or primary burials, were deposited in its three rooms prior to the carnivore intrusion. Only one of these (HR 11) is in Room 27a, which means that Rooms 18a and 26a averaged 6.5 individuals per room. A more secure finding is that the number of observed primary burials in rooms involving the less ambiguous evidence ranges from one (27a, 30a) to five (17a). Duplicate element types and numbers yields good confidence that Room 17a contains two more infant burials, for a maximum of seven individuals. Although the MNI for Structure 17 is nine, the bones from the remaining two individuals are intrusive.

Another way of looking at this data is to evaluate the frequency of mortuary rooms containing multiple primary burials. Including the three Room 18a iLinks and only the single *in situ* burial of Room 26, the prevalence of multiple depositions per room is 50% (3/6). When the substantial evidence for other disturbed burials in 26a is included, then two-thirds (66%) of the West Arm mortuary chambers contain more than one primary burial deposit. As a point of reference, the North Suite/STR 7 MLNI is 12, though most of the elements used for this determination are from Rooms 5a and 6a.

6.6 Comparative Analysis: Pueblo II v Pueblo III mortuary evidence

Comparison of the Pueblo II and Pueblo III evidence in terms of the scale variables described above highlights distinct differences in mortuary trends during Wallace's heyday as a Chacoan great house and its subsequent use as a mortuary facility. The *p*-values for tests of statistical significance using selected scale variables are reported in Table 6.16. Fisher's Exact Test evaluates the total array whereas individual proportional relationships are appraised with the N-1 Two-Proportion Test; these ratios are also displayed as prevalence indicators in Figure 6.15. The P2WR group consists of the four Pueblo II primary burials and one iLink, the P3WR13 subset comprises the ten *in situ* primary burials and the three 18a iLinks, and the P3WR32 group pertains to the Pueblo III MLNI. The Rooms designation refers to chambers containing a primary burial and Block refers to the Roomblock. From these results, distinctions in the scale of use of the Pueblo II (P2WR) versus the Pueblo III mortuary evidence is statistically meaningful primarily in respect to the P3WR32 subset. In contrast, the Pueblo III use of floors for mortuary deposits is significantly different to Pueblo II times, regardless of which P3WR subset is tested. This is a crucial point since this assay does not involve assumptions, however sound, regarding the original mortuary locations of the North Suite re-depositions. The only tested proportional relationship that exceeds the 95% confidence threshold concerns the number of individuals per roomblock. Yet, when this Block: Block PB relationship is considered in the context of the Block PB: All PB proportions, a plausible conclusion can be drawn that the former proportional relationship attests to a similar emphasis in the use of great house rooms in both Pueblo II and Pueblo III times. That said, the latter is unquestionably more intensive in terms of rooms used and age groups represented when all remains are considered.

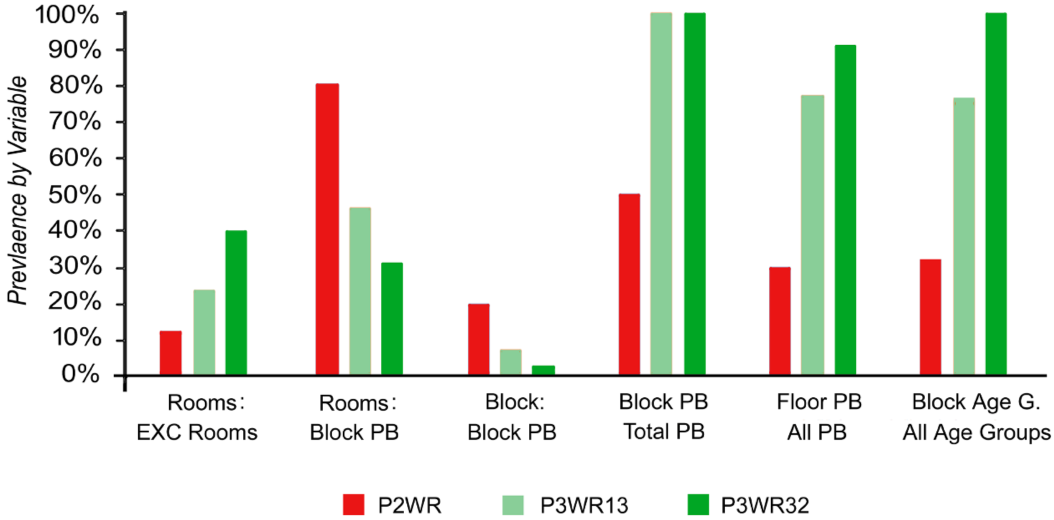


Fig. 6.15: Prevalence of Wallace Ruin Pueblo II versus Pueblo III scale variables.

Table 6.16: Significance test variables and results concerning the Pueblo II versus Pueblo III mortuary use of Wallace Ruin. Red font designates a significant difference (*p* <0.05).

Fishers Exact Test	**P2WR**	**P3WR13**	**P3WR32**
Block PB	5	13	32
PBD Rooms	4	6	10
Floor MCT (PB)	3	10	29
Block AG	2	5	6
P2WR v P3WR13		0.118	
P2WR v P3WR32			0.003

N-1 Two-Proportion	**P2WR**	**P3WR13**	**P3WR32**	**P2:WR13**	**P2:WR32**
PBD Rms: EXC. Rms	4:32	6:25	10:25	0.262	0.017
PBD Rms:Block PB	4:5	6:13	10:32	0.208	0.039
Block: Block PB	1:5	1:13	1:32	1	0.255
Block: PBD Rooms	1:4	1:6	1:10	0.666	0.505
Block PB: All PB	5:10	13:13	32:32	0.004	0.003
Floor MCT: All PB	3:10	10:13	29:32	0.027	<0.001
Block AG/All AG	2:6	5:6	6:6	0.092	0.019

Block roomblock; EXC excavated rooms; PBD primary burial deposit
PB primary burial; AG age groups

Although the P3WR subgroup is comprised of all age classes, there is an interesting divergence from the P2WR subgroup. None of the seven P3WR infants is a late term foetus or neonate, compared to two from the Pueblo II residential use of Wallace Ruin. Dental evidence indicates that each of the three youngest P3WR infants is 6 +/- 3 months in age, so at least 3 months old at the time of death. It is granted that the 25% prevalence of P3WR infants is an underestimate since it is derived from the subset of infants represented by dental evidence. However, though ISE long bones point to the presence of several more infants, all are longer than those of the very young P2WR infants HR 8 and 12.

6.7 Traumatic Injuries

The natural, peri-mortem damage caused by carnivores is addressed in Appendix E, but summary information regarding wounds occurring through human actions are addressed here; detailed descriptions are available in the osteobiographies provided in Appendix C. Sections 6.7.1 and 6.7.2 describe damage type by element whereas Section 6.7.3 considers trauma at the level of the individual in comparison to Ancestral Pueblo populations. As mentioned above, HR 11 has arrow wounds: one is implicated in an unsuccessful attempt on his life and three others involve a subsequent act associated with his death. The older adolescent HR 3 has severe, healed facial fractures of ambiguous cause. Thus, assessment of these wounds in the context of other Wallace individuals is necessary to evaluate their possible import in mortuary location choices. The correlation of their AMS findings with the violence trends described in Chapter 3 is addressed in this chapter's concluding section.

Table 6.17: The rare occurrence of AmF in the P3WR population, by skeletal region.

Occurrence	Head	Torso	Limbs[a]	Total
N Bones	349	1047	247	1643
N Suitable	255	924	225	1404
N AmF Observed	7	2	3	12
Prevalence of AmF	3%	< 1%	1%	1%

[a] excluding hands and feet

6.7.1 ANTE-MORTEM FRACTURE (AmF)

As is evident from the information provided in Table 6.17, the prevalence of healed fractures is an extremely low 1% in the skeletal remains associated with the Pueblo III use of Wallace Ruin. Each of the 12 breaks are either very well-healed or had achieved a stage of healing with no vestiges of woven bone. Cranial elements of the vault and face are slightly more affected than either bones of the torso or long bones. In addition to these, a single metatarsal (1/62) of mature development has a well-healed fracture whereas metacarpals and phalanges are unaffected. Descriptions of the damage involving primary burials are provided in their osteobiographies whereas details pertaining to ISE Cranium 145 and Radius 6.108 are provided below and in the Figure 6.14 photograph compilation.

These 13 healed fractures are distributed among the seven individuals identified in Table 6.18, which also provides comparative data regarding the absolute frequency of affected bones per element. Each of the five primary burials has a nearly complete skeletal representation, but Link 145 comprises five refitting cranial fragments and radius 6.108 is an isolated skeletal element. In each instance, the prevalence of AmF is less than 10% per element. Moreover, except for two right parietals, each bone has one ante-mortem fracture only.

Table 6.18: Prevalence of AmF in P3WR skeletal remains, by individual, element and skeletal region.

	Cranial						*Infra-cranial*					
Indiv.	FROV R	NAS L	NAS R	MAX L	MAX R	PAR R	CLV L	RIB L	ULN L	RAD L	RAD R	MT5 L
HR 3		0.08	0.08	0.07	0.07							
HR 6						0.05	0.04		0.06			
HR 10												0.02
HR 11								0.01			0.06	
HR 17						0.05						
LNK 145	0.04											
ISE 108										0.05		

6.7.1.1 *Cranial fractures*

The cranial damage documented in Figure 6.16 constitutes slightly more than half (54%, 4/7) of these fractures. However, four of the seven cranial bones involve a single blunt-force blow to the mid-face (nasion to prosthion) of adolescent male HR 3; these injuries include “telescoping” of the nasal dorsum and lateral luxation of the maxillary incisors. Even though this damage is consistent with severe Type III mid-face trauma (Meleca and Mathog, 1995:73), all fractures were healed by the time of death. The remaining cranial injuries involve blunt-force depression fractures of two right parietals and one frontal vault, each of which is well-healed. Both parietal wounds are located on a posterior parietal surface, but they are otherwise dissimilar in size and shape. The HR 6 fracture is a small (4-5mm), shallow circular injury whereas HR 17 has a shallow, elongated (12-10mm) wound.

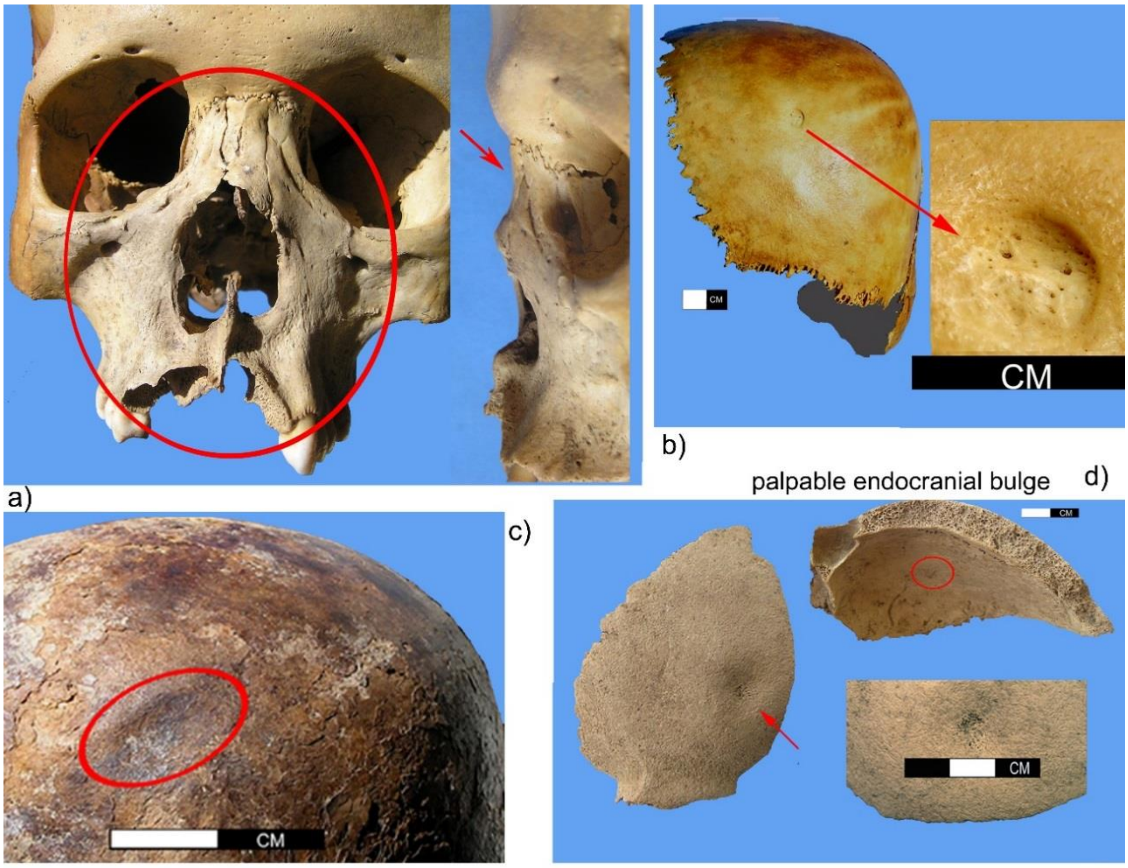


Fig. 6.16: Compiled laboratory photographs of all cranial wounds sustained by P3WR individuals:a) HR 3, left: Type III mid-face fracture; right, depression of the nasal dorsum; b) HR 6, circular depression fracture, right posterior parietal; c) HR 17, elongated depression fracture, right posterior parietal; d) Cranial Link 145, pond-shaped depression fracture, right anterior frontal.

Cranial Link 145 has a pond-shaped (12-15mm) depression fracture that affects the external and internal vault tables. This wound is located approximately at the hairline near the sagittal mid-line, and it extends 4-5mm into the diploë of a vault having pronounced marrow hyperexpansion. Although this fracture does not penetrate the internal table, a small, slightly raised lump can be palpitated in the area obverse to the ectocranial depression. Post-mortem bone surface damage precludes the identification of possible radiating fractures on the external surface, however the endocranial surface is in excellent condition and no radiating fractures are present. This injury is not associated with the post-depositional event that produced the irregular, dry-bone breaks along the edges of the five refitting calvarium fragments.

6.7.1.2 *Infra-cranial fractures*

No single factor accounts for the ante-mortem damage to the six affected infra-cranial elements, although a forward or sideways fall onto a solid surface is implicated in the forearm and clavicle fractures of HR 6, HR 11 and Radius 6.108 (Willett, 1997; Waters, 2010). As is observable in Figure 6.17a, child HR 6 has greenstick fractures of the ulna and clavicle whereas the radius of HR 11 has a Salter Harris break, accompanied by morphology changes to the distal end of the ulna and the navicular. The greenstick fracture of Radius 108 involves the anterior surface superior to mid-shaft, accompanied by an anterior deflection of roughly 30 degrees. Based on diaphyseal length comparison to its most likely antimere, this incomplete radius belongs to an early walker or climber of about 1 to 2 years of age. The fracture of the 5th metatarsal of HR 10 is consistent with an avulsion fracture in which a small region of bone is pulled away by the attached tendon or ligament when the foot is rotated excessively during footfall (Galloway, 1999).

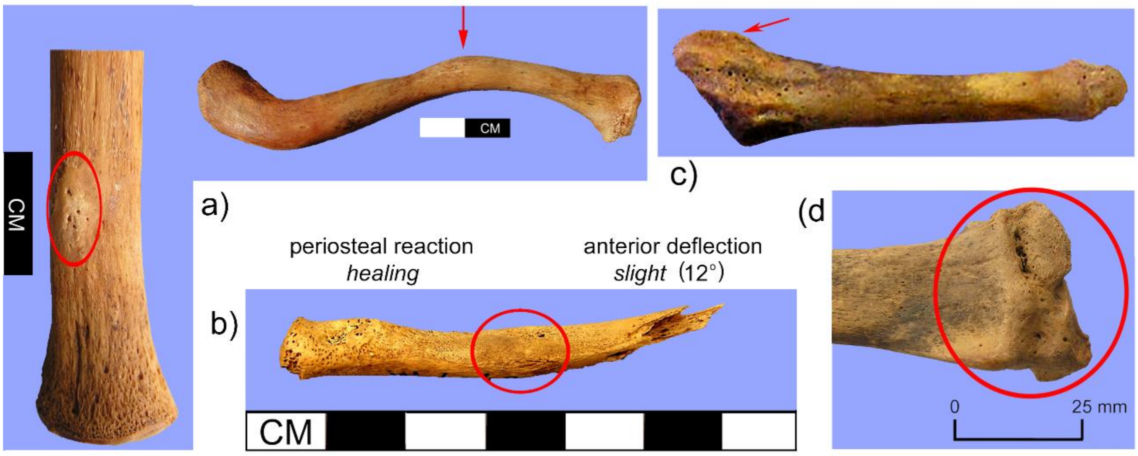


Fig. 6.17: Compiled laboratory photographs of the five P3WR ante-mortem infra-cranial fractures indicative of accidental injury: a) HR 6, greenstick fractures of the left distal ulna and medio-anterior clavicle; b) ISE Radius 6.108, greenstick fracture of left radius and sequelae; c) HR 10, avulsion fracture, left 5th metatarsal; d) HR 11, Salter-Harris metaphyseal fracture, right radius.

Each of the five blunt-force injuries is a common paediatric or adult accidental injury (Hutchison, 1997; Vitale, 2010). The extensive damage to HR 3's midface is indicative of a high velocity impact, which is inconsistent with damage caused by a fall or a blow from a closed fist. It could have been inflicted by a swinging blow with a hand-held object such as an axe or maul; the former is unlikely since the mid-face has no scratches or abrasions. Alternatively, as an older adolescent, he would have been of an age and size to be involved in construction activities.

In his assessment of injuries requiring treatment in emergency rooms, Hutchison (1997:440) reports that construction workers are especially prone to traumatic injuries to the face. The length of HR 3's facial damage is about the average width of the round secondary beams used to construct ceilings or roofs. Potentially, the swinging object may have been such a beam, balanced on the shoulder of another person, which accidentally hit HR 3 in the face when its bearer turned about. Thus, although HR 3's antemortem trauma may represent an act of intentional violence, probably with homicidal intent, an accidental injury is also a strong possibility.

In marked contrast, two short fracture lines, highlighted in red in Figure 6.18, extend from the margins of a still-embedded projectile point that intrudes into the dorsal surface of the right 5th or 6th rib of HR 11. Both are unquestionably the result of intentional violence. Although healed, these small cracks are still visible; thus, they are not yet indistinguishable from the original bone surface as eventually occurs in fracture remodelling (Martin et al., 2010:67). This factor, along with the accumulation of bone deposits upon the point stem, suggest that this injury occurred weeks or months, but not years, prior to death.

Fig. 6.18: Laboratory photograph of healed radiating fractures associated with an arrowhead tip embedded in the dorsal surface of a right rib (5th or 6th) of HR 11.

6.7.2 PERI-MORTEM FRACTURES (PrF)

Of the 240 or so bones with peri-mortem fractures, just three or four have wounds indicative of human agency. Figure 6.19 displays two of these injuries. Moreover, these wounds are restricted to HR 11. Each entails a v-shaped groove that is consistent with an arrow wound; possibly the groove, and associated bone fracture responses, of the humerus was inflicted with a swipe from a thick biface (A. Outram, pers. comm, 2015). The cranium of HR 11 is in a poor, fragmented condition due to the damp, alkaline depositional environment of the burial pit floor, but the bone is sufficiently intact for reliable identification of depression fractures. There is no peri-mortem damage of the cranial elements or any other infra-cranial element. The vertebrae, which are in very good condition, were examined minutely, and there are no nicks or cuts suggestive of arrow wounds.

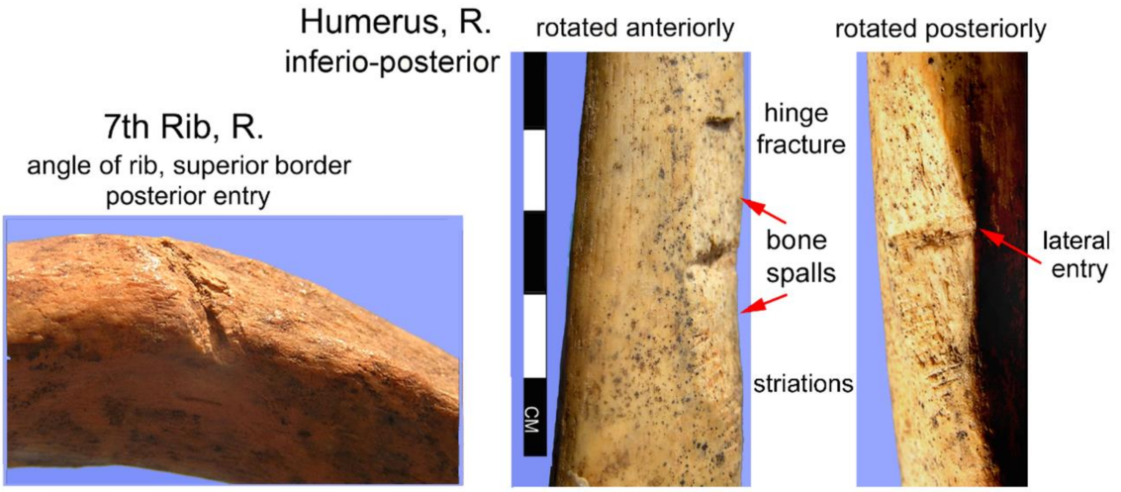


Fig. 6.19: Laboratory photographs of two unhealed v-shaped groove fractures incurred by HR 11 at about the time of death; both are indicative of intentional violence. Left, arrow wound; right, two views of a projectile or axe wound.

The embedded arrow point of HR 11 and his peri-mortem v-shaped groove injuries are unique in the Mesa Verde Region archaeological record. Focused archaeological studies that make use of skeletal data to evaluate Ancestral Pueblo violence and warfare within the MVR (Kohler and Turner, 2006; Kohler et al., 2009; Kuckelman et al., 2000; Lambert, 2014) or the MSJR's La Plata Valley (Martin, 2008) have not identified any individuals with such wounds. Only one individual within this study's comparative populations has an embedded projectile point. Judd (1954) reports a lumbar vertebra with an embedded projectile point in commingled human remains within the Western Burial Cluster of Pueblo Bonito. Otherwise, evidence of sharp force trauma represented by v-shaped grooved defects that are consistent with a projectile injury is lacking. Turner and Turner (1999) describe another individual from the Pueblo I site of Alkali Ridge (SE Utah), who has an embedded projectile point in a vertebra, in concert with blunt force trauma to the cranium and sharp-force trauma consistent with scalping. In contrast to HR 11, he was not accorded a formal burial.

6.7.3 INDIVIDUAL LEVEL ANALYSES

By the methods employed above, fractures in Pueblo III skeletal remains at Wallace Ruin are rare. However, this result obscures the rate of occurrence at the level of the individual. Evaluation of the well-represented skeletal elements from the P3WR14 subgroup, comprised of the ten *in situ* and four iLink individuals, yields a high rate, in epidemiological terms, of about 36% (5/14), inclusive of ante-mortem and peri-mortem fracture and regardless of skeletal region. However, fracture prevalence decreases by about one-third, to 21%, when calculated in terms of the total number of affected individuals (7) versus the Pueblo III MLNI (32). Put another way, 64% of P3WR14 individuals and 79% of the (estimated) P3WR burial population have no evidence of skeletal trauma. Another key point is that comparison of fracture patterns of two P3WR subgroups to those of the eight Ancestral Pueblo populations detailed in Table 6.19 demonstrates that Wallace fracture rates are not particularly unusual in terms of the comparative population average. The segregation of cranial v infra-cranial evidence, by ante-mortem (AmF) and peri-mortem (PrF) fracture types, provides a more refined understanding of skeletal damage patterns between these groups and overall. The WR13 cranial group includes all individuals classed as a primary burial, with the exception of HR 4. The numbers used for the WR24 and WR32 subsets represent MLNI finding per skeletal region. Also, the TC437 group comprises the 437 assessed crania in the comparative population, and the 407 individuals with assessed infra-cranial remains are denoted as the TC407 group.

Even when considering such factors as excavation bias, differential preservation and inter-observer error, Wallace's AmF cranial fracture prevalence rates are not uncommon, being neither among the highest nor the lowest of the frequencies reported per community. In addition, evaluation by cranial region highlights that individuals from five or six communities have higher rates of vault fracture than does Wallace, though the deficit of vault bones in the P3WR population may skew this result. On the other hand, the absence of cranial PrF in P3WR individuals is clearly uncommon, with just two other communities lacking such evidence.

Table 6.19: Prevalence of ante-mortem (AmF) and peri-mortem (PrF) fractures in Wallace Ruin (P3WR) individuals compared to occurrences in eight comparative Ancestral Pueblo communities. Damage per cranial region is highlighted in yellow. Calculations are by individuals (N) per skeletal region, as noted.

	Cranial						*Infra-cranial*		
Site/Community	N	AmF	PrF	Vault Total	Face Total	Nose Total	AmF	PrF	N
P3WR13 & 14	**13**	**23%** (3)	**0%**	**15%** (2)	**7%** (1)	**7%** (1)	**23%** (3)	**7%** (1)	**14**
P3WR24 & 32	**24**	**17%** (4)	**0%**	**14%** (3)	**n/a**	**n/a**	**13%** (4)	**3%** (1)	**32**
Yellow Jacket[a]	30	5%	3%	10% (3)			0%	3% (2)	68
Ute Mtn Piedmont[b]	24	14%	30%	17% (4)			14% (4)	19% (5)	24
Sand Canyon P. [c]	13	21%	26%	23% (3)			0%	5% (1)	25
Dolores River[d]	64	2%	9%	2% (1)			13% (9)	9% (6)	64
La Plata, NM[e, f]	39	26%	0%	23% (9)	3% (1)	3% (1)	20% (14)	0%	65
P. Bonito, N.Clust.[g]	18	44%	26%	44% (8)	6% (1)	11% (2)	27% (7)	0%	26
ChacoCan. Doms.[h]	62	1%	0%	2% (1)			18% (24)	0%	135
Grasshopper P.[i]	187	34%	7%	34% (63)					
% Comparative		**18%**	**13%**	**21%**	**4%**	**5%**	**14%**	**4%**	
N Comparative	**437**	**79**	**57**	**92**	**2**	**3**	**58**	**14**	**407**

[a] Karhu, 2000; [b] Lambert,1999; [c] C. Bradley,1998; [d] Stodder, 987 (BMIII-PII); [e] Martin et al., 2001 (PII-PIII); [f]Martin, 2008 (PII-PIII); [g] Marden, 2011 (PII); [h]Akins,1986 (PII); [i] Baustian et al., 2012 (PIV, adults)

The same situation holds for AmF infra-cranial damage; moreover, Wallace is even less distinctive (1/14, 7%; 2/32, 6%) if the barely discernible greenstick fractures of HR 6 and HR 10 are excluded. According to the results reported in Table 6.20, statistical assays with the N-1 Two Proportion Test shows perhaps one significant difference between any Wallace Ruin subgroup and the pertinent (cranial v infra-cranial) Total Comparative population. Owing to the absence of such damage at Wallace Ruin, the score (p=0.059) for peri-mortem cranial fracture occurrence in the P3WR24:TC437 test is meaningful only when p<0.10.

Table 6.20: N-1 Two-Proportion tests for ante-mortem (AmF) and peri-mortem (PrF) fracture prevalence in P3WR versus the Total Comparative group, by individuals. Red font designates a significant difference when p <0.05; italicised when p <0.10.

Test	Proportions	AmF	PrF	Test	Proportions	AmF	PrF
	Cranial				*Infra-cranial*		
WR13:TC437	3/13 v 79/437	0.645		WR14:TC407	3/14 v 58/407	0.453	
WR24:TC437	4/24 v 79/437	0.861		WR32:TC407	4/32 v 58/407	0.784	
WR13:TC437	0/13 v 57/437		0.163	WR14:TC407	1/14 v 14/407		0.314
WR24:TC437	0/24 v 57/437		*0.059*	WR32:TC407	1/32 v 14/407		0.924

WR13 primary burials, exc. HR 4; WR24 PIII cranial MLNI; TC437 Comparative, cranial
WR14 primary burials; WR32 PIII infra-cranial MLNI; TC407 Comparative, infra-cranial

6.7.4 INTERPRETATIONS

Although P3WR damage patterns per individual are different to those in a few comparative groups, they are not distinctive overall, especially when considering the various sources of evidence bias. While a handful of individuals experienced a fracture, or soft tissue sequelae, that would have been noteworthy, the majority of those deposited at Wallace did not. Accordingly, similar findings in terms of prevalence by elements and the individual indicate that their depositions within this great house was not predicated upon sustaining skeletal damage during life or about the time of death.

Owing to the carnivore disturbance, a realistic prevalence of acts that may have been associated with intentional lethal violence is impossible to ascertain for P3WR remains. Yet, from these results only one or two individuals incurred injuries characteristic of such extreme measures within a year or so of deposition at Wallace. If HR 3's injuries involved a deliberate act, Walker (1997) interprets damage to the face (and nose) as consistent with unplanned, impulsive interpersonal violence rather than inter-group aggression. That HR 11 was the victim of two attacks of lethal intent within a year or so of death is unmistakeable. Based on their AMS results, both HR 3 and HR 11 died sometime between AD 1180 and 1230 which, as explained in Chapter 3, is a timespan with no discernible major outbreaks of violence. Assuming deliberate intent, whether the ante-mortem injuries of HR 3 and 11 occurred in the same incident is unknown, as is whether any of these incidents involved a group or interpersonal "score settling."

The peri-mortem trauma of HR 11 provides convincing evidence of homicidal intent, so it is worth evaluating whether his manner of death influenced his deposit location in a subfloor location at Wallace. This evidence does not support the idea that vertical provenience was the primary factor. Although deposit on a room floor was most common at Wallace, three more individuals (1 PII) are in subfloor loci, and none exhibits skeletal evidence indicative of a violent death. In addition, if HR 3 was also a victim of violence, then a Wallace subfloor location would have been in order, if such a manner of death was implicated in location decisions. As there is no evidence for other primary burial deposits in Room 27a, a more likely scenario is that this factor underlies his isolated location within that room. On the other hand, even that possibility is problematic since other rooms (29 and 30a) have just one or two Pueblo III primary burials and, also, the rationales underlying mortuary location decisions per individuals is unknown.

6.8 Conclusions

To recapitulate, the first goal of this chapter is to confirm Bruce Bradley's (1988; 1993a; 2010a) interpretation that the Pueblo III human remains within the Wallace great house represent the deposition of primary burials within its rooms, regardless of their discovered *in situ*, disturbed or re-deposited archaeological contexts. This detailed evaluation of skeletal and mortuary evidence upholds his primary burial designation for 13 relatively intact, *in situ* skeletons and three disturbed skeletons retaining multiple labile and persistent anatomic connections and composed limb arrangements. Material evidence includes shrouding, woven willow mats, ceramic vessel accompaniments, and projectile points and items of a probable ritual nature in the case of HR 11. Associated grave goods are consistent with MVR offerings. The numerous arrowheads in the grave of HR 11 are an exception, but healing or death rites specific to his manner or cause of death (arrow wounds) may be implicated. Grounds for inference of post-deposition disturbance within the great house, as opposed to a delayed or second mortuary event, are provided by two sources of evidence: the ability to trace animal burrows within strata and the re-association of bones in burrows to specific skeletons. The presence of numerous persistent anatomic connections further indicates that transport of corpses to Wallace Ruin occurred when crania, limbs, and torso bones were still in normal anatomic relationship.

The second chapter goal relates to the re-assessments of previous interpretations of mortuary context microenvironments. Skeletal displacement evidence pertaining to corpse decomposition processes confirms Bradley's previous interpretations (1988, Tab. 6; 2010) that most Wallace Ruin burials were deposited upon a surface room floor (or use-surface) and in an open space (void). Approximately three-fourths (7/10) of the *in situ* burials are in such loci. Post-deposition disturbances confuse the issue, but this result is probably an underestimate. The likelihood is that the most, if not all, of the carnivore-disturbed remains came from exposed primary burial contexts located on room floors. Generally speaking, *anthropologie de terrain* methods provided sufficient grounds for these findings. However, the extent of mortuary context disturbances from animal burrowing was sufficient to raise questions about the suitability of this approach for evaluating small-scale anatomic displacements. This researcher's development of ROM guidelines for identifying non-anatomic lower limb movements in skeletal remains provided a much more reliable method for the confirmation of corpse decomposition microenvironments within this great house.

The goal of establishing the temporal associations of all but a few skeletal deposits per Pueblo II or III Period is achieved as well, even though most of the specific details are provided in Appendix E. The precise dates of death for the P3WR *in situ* individuals are unknown. While there is a great deal of overlap in AMS results, the variations mean that it is unlikely that all died at the same time. In addition, the preponderance of intact anatomic connections among these remains excludes the potential that their corpses were removed from residential primary burial contexts and transported to the great house as part of a single mortuary event. Benziger (2000) describes such actions as an attempt to invoke "memory culture" as a public means to emphasise a cosmological/ideological viewpoint, the affirmation of ancestors or kin relations. Such evidence is critical to the interpretation of West Arm mortuary use as involving episodic events, albeit within a timespan of fairly limited duration.

The carnivore and human intrusions into the great house are clearly subsequent to skeletisation of the disturbed primary burials. Stratigraphic and ceramic evidence places the re-deposition of carnivore-disturbed remains in the North Suite within the Pueblo III Period. The combination of stratigraphic and skeletal evidence establishes that mortuary use of the South Suite did not resume after the carnivore intrusion; moreover, evidence fully described in Appendix E suggests that no corpses had been deposited within the South Suite for several years prior to this event. Whether other sections of the great house were used instead is yet to be determined. Stratigraphic and ceramic evidence show that North Suite Structures 6 and 8 accumulated Pueblo III cultural refuse after the re-deposit of ISE on their ground-storey floors. For reasons provided in Chapter 11, the human intrusions into Rooms 17a and 27a probably took place prior to the final Ancestral Pueblo migrations from the N. San Juan Region by AD 1280.

Despite the interpretive challenges created by the carnivore damage and re-deposition of skeletal elements from their primary deposit contexts, the fourth goal is also met regarding obtaining a reasonably accurate determination of the Wallace mortuary program demographic patterns per period. The chances are that the P3WR floor burials number in the upper twenties to low thirties. All age groups are represented, and the P3WR ratio of males to females is almost balanced. Unfortunately, it is uncertain whether this age-sex structure is representative of the undisturbed Pueblo III burial assemblage or if it merely captures the outcome of carnivore scavenging. In marked contrast, P2WR age structure is extremely unbalanced. The preponderance of infants (and one young child) indicates that deposition within a West Arm room was deemed a suitable mortuary location for these very young individuals only. Yet, the disturbed elements from two infants interred in the extramural midden also serves notice that room deposition was not the only mortuary option for individuals of this age during Pueblo II times.

Taphonomic evidence is convincing that the disordered and damaged skeletal elements in the North and South Suites are the result of carnivore scavenging of incompletely skeletonised human remains, when bones still retained some collagen. The single exception pertains to the intentional human disturbance of the skeletonised remains of HR 11 of Room 27a, who incurred peri-mortem arrow wounds. Although many ISE were subsequently moved by Ancestral Puebloans to more secure rooms in the North Suite, others were left in their room of deposition. Since there is no evidence that these disordered deposits are related to human violence or post-mortem processing, all remains can be treated as mortuary evidence whether classified as a burial deposit or secondary mortuary treatment.

Determinations of scale of use of the great house for primary depositions, the fifth chapter goal, is clouded by the large number of unexcavated rooms. However, there are now firm grounds to establish which rooms were used for mortuary purposes, which includes the addition of Room 15b. The analyses also provide strong evidence that most of the Pueblo III rooms used for primary burial deposits contained multiple individuals.

Although these primary goals were largely successful, other questions remain unanswered. The application of *anthropologie de terrain* provides mixed results regarding the potential to identify deliberate post-deposition interactions of a planned, commemorative nature, either as part of ancestor reverence or the invoking of assistance from “powerful dead.” Site formation evidence, and the ability for carnivores to gain access into the great house, highlights that humans entered Rooms 17a, 18a and 26a through established passageways during the mortuary use of Wallace Ruin. The actual duration and sequence of depositions within these room is indeterminate, apart from the certainly that the primary burial deposits HRs 5 and 6 on Surface 3 of Room 17a pre-date the depositions of HRs 2, 3 and 4 on Surface 2. Potentially, commemorative activities could have taken place on Surface 2 at any point up to the collapse of the upper-storey floor. Conceivably, the presence of several faunal bones in the immediate vicinity of HR 3, along with the crushed remains of a large Mesa Verde Black-on-white water jar (olla) and a large corrugated storage jar in the area between HR 3 and HR 4 (underneath a section of the fallen east wall) could represent such activities.

Possible small-scale disordering of anatomic connections due to human interactions with the corpse or skeleton cannot be ascertained. The effect of animal burrowing is problematic, as are the natural displacements associated with decomposition in an open space. Evidence of shrouding indicates that direct interaction with the corpse itself would not have been possible; even more-so when coverings included willow mats and possibly other organic materials that have left no traces. The presence of a small informal hearth in Room 6a may represent some sort of commemorative event that took place after the re-deposit of disturbed human remains in the North Suite. However, since it is situated upon a fill deposit at a level several centimetres above the re-deposit surface, such an interpretation is open to question. On the other hand, setting the circumstances of HR 4 and 11 aside, it is possible to rule out such major interventions as the patterned removal of specific bones from skeletonised remains for commemorative or ritual purposes (Nilsson Stutz, 2003).

This comprehensive analysis of the skeletal and mortuary evidence presented in this chapter yields several significant findings, from which conclusions are drawn for hypothesis testing. To begin with, the confirmation that the Wallace great house was used for Pueblo III primary burial deposits meets the shared premise of the four hypotheses evaluated in this study. A second key point is that AMS results establish that all dated Pueblo III depositions occurred prior to AD 1220. The combination of corpse decomposition and carnivore disarticulation patterns, in concert with stratigraphic analysis provides a credible basis to conclude that all PIII West Arm depositions occurred within this timeframe as well. Whether this was also the case for the three individuals in Annex rooms is unknown.

These radiocarbon results provide essential evidence for evaluating the two hypotheses with a specified temporal component. To begin with, the Chacoan Revival Hypothesis is partly falsified since the non-residential mortuary use of the West Arm began several decades prior to AD 1250. On the other hand, even though information provided in previous chapters forms the basis for falsification of the spatial component of the Socio-natural Hypothesis, its temporal premise is consistent with Glowacki's (2006) inferred Eastern Expansion c. AD 1200-1240. Although both hypotheses involve premises supported by findings presented in this chapter, the same cannot be said for the Cohort Hypothesis. There are no grounds to conclude that a Pueblo III deposition at Wallace Ruin was predicated on the basis of age, sex or a combination thereof; nor was it based on injury or violent death.

One unexpected finding is the determination that several individuals were deposited in an upright knees postural arrangement. The potential that it may have interpretive connotations was not anticipated at the outset of this research undertaking. As will be established in Chapter 11 and discussed in Chapter 13, this is yet another Wallace Ruin anomaly that is representative of meaningful intent. That chapter reconsiders the Chaco Revival notion in terms of the mortuary signifiers of a community of practice particular to a house society social organisation. Before this, Wallace Ruin's mortuary practices must first be contextualised in comparison to those occurring elsewhere. Owing to the complexity of four potential mortuary variations, and one involving post-mortuary interactions, each variant is addressed separately in the five chapters that follow.

CHAPTER 7

WALLACE RUIN VARIANT: DEPOSITION IN A ROOMBLOCK

7.1 Introduction

All of Wallace Ruin's Pueblo III primary burial deposits are within the roomblock component of the great house, whereas its Pueblo II depositions are in the roomblock and midden. Accordingly, one of the chapter goals is to establish the extent to which Wallace's PIII mortuary program represents substantially different choices regarding mortuary locations compared to evidence from other San Juan Region sites. Wallace functioned as a Chacoan great house with a small residential component in Pueblo II times. However, analysis of the Wallace mortuary program only in respect to great house evidence is insufficient. Together, the collapse of the Chacoan regional system and the non-residential use of the great house after AD 1180 means that PIII mortuary location choices might instead be founded upon practices common to residential communities comprised of domiciles. The second need is to ascertain if other great houses have mortuary evidence that supports Bradley's Chacoan Revival Hypothesis, even if Wallace's dates are inconsistent with the proposed post-AD 1250 timespan. This appraisal includes Aztec West and Salmon, the outlier great houses specifically mentioned by Bradley, but grounds for a pan-regional movement would be supported by the occurrence of large numbers of primary burials in roomblocks at other sites.

This chapter centres upon the spatial analysis of mortuary evidence associated with roomblocks, or surface rooms, in great houses and domiciles. Evaluation of mortuary location data by statistical means will demonstrate that the occurrence of PII primary burial deposits within the Wallace roomblock is comparatively unusual but not significantly so, overall, relative to other great houses or domiciles. In contrast, it is demonstrated that the PIII mortuary use of the Wallace roomblock is atypical in several respects to other great house buildings, which, unlike the Lakeview great houses of Wallace and Ida Jean, maintained a post-AD 1150 residential component at some scale. During Pueblo III times, Wallace's roomblock-centric mortuary program is most like MSJR great house practice but, significant to this study, completely different to patterns in MVR and MSJR domiciles. A second crucial point is that it while it will be shown that the premise that the postulated Chacoan Revival was a pan-regional movement is not supported by the evidence, the evidence is not so firm as to merit falsification of the hypothesis.

7.1.1 BACKGROUND

To review information presented previously, owing to its status as a Chacoan great house, Wallace has connections to great houses and potentially typical residential communities throughout the expanse of the San Juan Region. Its association with the Chaco Canyon core area dates to the construction of Old Wallace. Wallace's substantial enlargement took place when the Chacoan satellite great house at Aztec Ruin of the Middle San Juan Region was gaining economic ascendency over Chaco core great houses. During its phase as a Pueblo III ritual and mortuary facility, its associations involved connections to one or more MVR residential communities situated 10 or more km distant. Although there is little evidence for the pan-region trade networks that existed in Pueblo II times, the possibility remains that members of MVR residential communities maintained familial and other associations with MSJR settlements (Reed, 2008b), and perhaps, the small Pueblo III communities that existed in Chaco Canyon.

Bradley's Chacoan Revival Hypothesis is partly rejected since AMS results for five Wallace individuals indicate dates of death prior to this movement's projected c. AD 1250 date of development. However, the *raison d'etre* for this hypothesis has yet to be considered in this thesis. Although Bradley first presented this proposal in "Pitchers to Mugs: Chacoan Revival at Sand Canyon Pueblo" in a 1996 edition of *Kiva* (61:241-255). To summarise, drawing upon the cultural revitalisation theory espoused by Anthony Wallace (1966:157-163), Bradley (2008:241) proposes that, a "rational, revivalistic, nativistic movement, heavily based on Chacoan symbolism" arose in the Northern San Juan Region at approximately AD 1250. He argues that specific architectural forms and ritual artefacts gave physical expression to concepts that recalled the perceived zenith of Ancestral Pueblo lifeways during the so-called Chaco Phenomenon that dominated the Northern San Juan Region c. AD 1040-1150. In his view, the impetus for this movement arose during a time in which the Mesa Verde Region experienced climatic degradation, significant changes in settlement patterns, social upheaval and inroads of the rival and eventually predominant Kachina belief system. Although Bradley focuses upon archaeological evidence from the MVR, he also considers the mortuary use of former Chacoan great houses of the Middle San Juan Region as a key attribute of this movement. In his words (Ibid.: 246)

> Widely overlooked but equally important is a late Pueblo III pattern of reuse of abandoned Chaco outlier sites. This reuse has been noted at Aztec West (Lister and Lister 1987), and Salmon Ruin (Ferguson and Rohn 1987) in the San Juan/Animas River areas of northern New Mexico, and Wallace Ruin (Bradley 1988) in the Montezuma Valley of southwestern Colorado. Thirteenth century reuse of great house sites in Chaco Canyon has also been documented (Vivian 1990:388). This reuse seems to focus on mortuary and ritual activities, but may include habitation (Lekson and Cameron 1994). I believe that this divergence from the general settlement pattern represents a significant expression of how late Pueblo III peoples in the Mesa Verde region understood the historical landscape.

For the purposes of his article, Bradley focused upon theoretical considerations. Hence, his brief summation of putative Chaco-inspired mortuary evidence does not mention such attributes as scale of use or the specific mortuary locations. Nor does he address the possibility that the disposal of the dead within these monumental buildings may rather represent a pervasive shift to the use of surface structures for mortuary use by members of the local residential communities, as for example in Yellow Jacket Hamlet of the MVR.

7.1.2 APPROACH

Thus, as described in Chapter 3, the ebb and flow of migrations and the existence of exchange networks within the San Juan Region means that evaluation of mortuary location choices pertaining to roomblocks must be evaluated at scales both large and small, and in terms of the two major temporal periods. Of note, although Morris 41 is within the boundary of the MSJR, it is only some 10 km farther from Wallace than sites clustered at the southern end of the Sleeping Ute Mountains. Aspects of this investigation involve situating the sites within their temporal context. It also involves situating sites and intra-site components within their horizontal plane; that is, within the landscape, within major site components, and rooms within buildings. Interrogation of the vertical plane of surface rooms is addressed in the next chapter.

This chapter thus centres upon comparative evidence regarding Ancestral Pueblo mortuary location choices by occurrence of the three MCT associated with the roomblock component of a site; the seven subsurface and extramural MCT are pooled as Other. To review, by Pueblo II times this fundamental configuration comprised a roomblock, a subsurface structure within the adjacent courtyard or plaza, and an extramural zone that contained the midden, storage pits and the like. In multi-storey buildings, room counts reflect the number of ground-storey rooms, but primary burials and rooms with primary burial deposits are tallied regardless of the storey involved. Rooms are evaluated in terms of existence in a temporal period rather than their suitability for deposition in an open space. The comprehensive extent of this comparative evaluation, which goes far beyond other scholarly efforts, is underscored by the Table 7.1 summary of the results obtained for each major analytical unit assessed, per period. Wallace Ruin data are excluded; also, to avoid an undercount, the two Indeterminate PII/III individuals associated with Albert Porter Pueblo great house are arbitrarily allocated to each temporal period.

Table 7.1: The distribution of San Juan Region primary burials, by study unit and

	MVR		**MSJR**		**CCL**		Subt.	Subt.	Total
	PII	*PIII*	*PII*	*PIII*	*PII*	*T. PII-III*	*PII*	*PIII*	
Sites	42	36	14	10	2	2	72	53	125
Great houses	3	3	2	2	2	2	7-9	7-9	10
Domiciles	71	51	18	28			89	79	168
Primary Burials	240	272	122	367	101	19	482	639	1121

MVR Mesa Verde Region; MSJR Middle San Juan Region; CCL Chaco Canyon Locality; PII Pueblo III; PIII Pueblo III; T. PII-III Transitional Pueblo II-III

7.2 Comparative Great Houses: Descriptive Evidence

In addition to Wallace, 16 Chacoan great houses are assessable for evaluation of the use of roomblocks for primary burial deposits. These great houses are distributed almost equally between the three major archaeological study units: six are MVR sites, five are in the MSJR and five are in Chaco Canyon. Ten (56%) are associated with at least one Ancestral Pueblo primary burial deposit. The six without primary burial deposit (PBD) evidence consist of Escalante Ruin and Lowry Ruin (MVR), both of Morris 39’s great houses and Morris 41’s

Building 16 (MSJR), and Pueblo Alto (CCL). The individual in a Pueblo Alto kiva is a Navajo child who post-dates the final abandonment of the great house (Akins, 1986). Potentially, extramural burials found near Albert Porter Pueblo and Mitchell Springs Pueblo A are associated with a nearby unit pueblo (i.e., domicile) rather than either great house. Although this could mean that Albert Porter has no associated Pueblo II primary burials, this possibility is set aside to avoid an undercount of such evidence. The locations of the assessed great houses are mapped in Figure 7.1. Table 7.2 displays raw figures regarding mortuary spatial evidence, organised by region, site components, and period. The subsurface structure (kivas) and extramural zone component results are pooled under Other. Table 7.3 reports evidence pertaining to rooms so utilised versus those excavated.

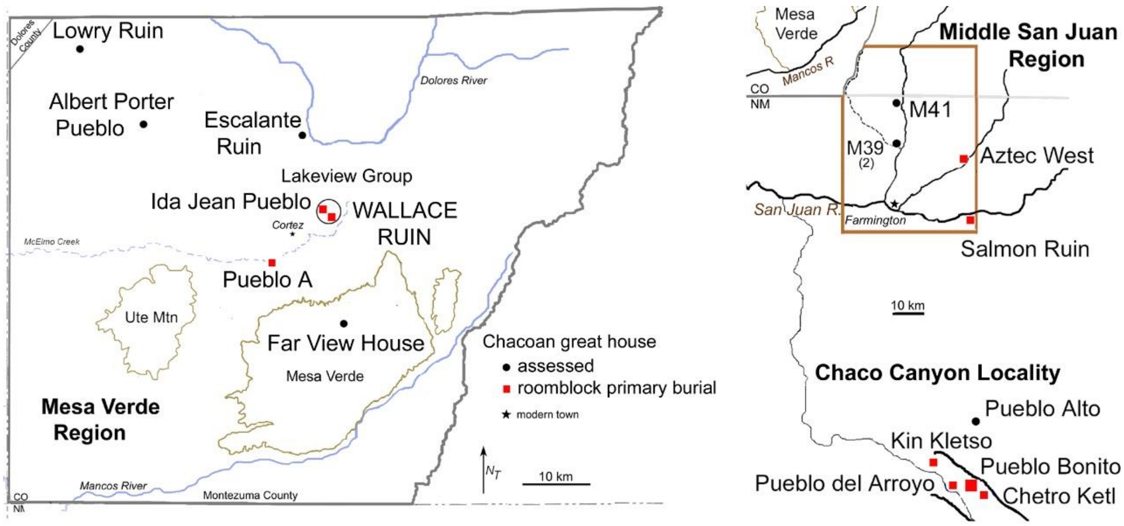


Fig. 7.1: Locations of assessed great houses, by San Juan Region study unit. Those with a primary burial in a roomblock context are highlighted.

Table 7.2: Distribution of primary burial deposits in roomblocks versus other proveniences, by SJR subdivision, great house, and period.

	MVR				**MSJR**		**CCL**				Total
	IJ	MS	AP	FV	AW	SR	PB	CK	KK	dA	
Pueblo II											
BLOCK	3				2	4	97	2			108
Other	6		1	1	4	U	1	1			13
Ind. PII/III											
BLOCK					16	1			6	10	33
Other					2					3	7
Pueblo III											
BLOCK	2	2			120	62					186
Other		1	1		11	4					16
Total											
BLOCK	5	2			138	67	97	2	6	10	327
Other	6	1	2	1	17	4	1	1		3	36
Total	11	3	2	1	155	71	98	3	6	13	363

AP Albert Porter; AW Aztec West; CK Chetro Ketl; dA Pueblo del Arroyo; IJ Ida Jean; KK Kin Kletso; M41 Morris 41; MS Mitchell Springs Pueblo A; PB Pueblo Bonito; SR Salmon Ruin

Table 7.3: Occurrence of SJR rooms with a primary burial deposit (PBD) relative to the number of excavated ground-storey rooms, by region, great house and period.

	Excav. [a]	With PBD	PII	PII/III	PIII
MVR	**100**	**5**	**1**		**4**
IJ	8	3	1		2
MS	20	2			2
FV, ES, AP, LW	70	0			
MSJR	**310**	**69**	**6**		**60**
AW	200	36	2	8	29
SR	60	33	4	1	31
M39N/S, M41	50	0			
CCL	**655**	**28**	**13**	**15**	
PB	350	12	12		
CK	175	1	1		
KK	65	5		5	
dA	50	10		10	
PA	15	0			
Total	1065	102	20	24	64

[a] Excavated room quantities rounded to the nearest 5 except for Ida Jean Pueblo (IJ)

AP Albert Porter; AW Aztec West; CK Chetro Ketl; dA Pueblo del Arroyo; ES Escalante; FV Far View; IJ Ida Jean; KK Kin Kletso; LW Lowry Ruin; M39N/S Morris 39 North/South; M41 Morris 41; MS Mitchell Springs Pueblo A; PA Pueblo Alto; PB Pueblo Bonito; SR Salmon Ruin

7.2.1 MESA VERDE REGION: INTRA-SITE ANALYSES

7.2.1.1 *Ida Jean Pueblo*

Archaeological evidence (Brisbin and Brisbin, n.d.) and oral tradition (J. Brisbin, 2010: pers.comm.) indicate that the IJP primary burials are in three of the four masonry rooms excavated, or eight rooms when including the *jacal* (stick and mud) structures erected along the west wall of the great house. Pueblo II contexts occur in 13 percent of these rooms versus the 25 percent utilised after AD 1180. Considering the Brisbins' excavation data only, IJP averages two primary burials per room. The PIII evidence yields a ratio of one individual per room, but this may be somewhat higher if the southeast "burial room" contained multiple individuals. The locations of two of these rooms are provided in Figure 7.2. Three individuals are from the southwest corner of the building in Room 7. The location of the one PIII individual discovered during formal research is unspecified. Credible oral tradition places the looted room with at least one post-AD 1180 individual in the southeast corner of the building.

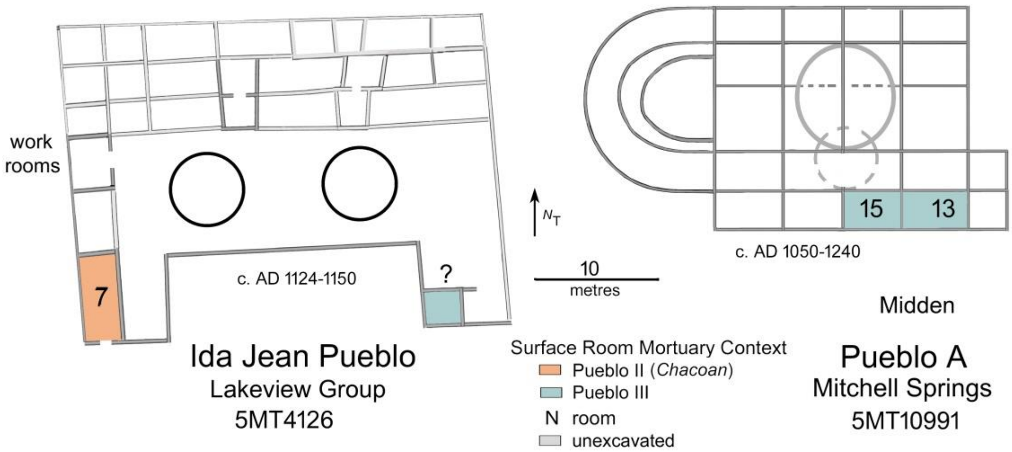


Fig. 7.2: Plans of the distribution of rooms used for primary burial deposits in Mesa Verde Region great houses. Ida Jean Pueblo (Left: adapted from Powers et al., 1983: Fig. 77) and Pueblo A (Right: adapted from Dove, 2014: Fig. 1).

7.2.1.2 *Pueblo A*

Stronger statements can be made about the occurrence and horizontal distribution of mortuary rooms within Mitchell Spring's Pueblo A, where its twenty or so ground-storey rooms are completely excavated. Two PIII individuals from Mitchell Springs are in adjacent rooms in the southeast corner of the expanded great house. If the PIII individual in the midden is associated with the great house, then 66% of the Pueblo A burials are in the roomblock. In addition, 10 percent of the ground-storey rooms contain a primary burial, at a ratio of one individual per room. Whether either roomblock PBD dates to the post-AD 1180 timespan is unknown. Neither is accompanied by a diagnostic artefact, and Dove and Dove (1997:32) do not associate a Mesa Verde B/w mug with Burial 6 of Room 13.

7.2.1.3 *MVR Synthesis*

At most, four of the six (67%) comparative MVR great houses are associated with a primary burial deposit. Only Ida Jean and Pueblo A have a roomblock mortuary context, for a 33% great house prevalence. Slightly less than half (41%) of the individuals are in a surface room context. All six graves at IJP are PII in age whereas the single, potential, Pueblo A midden burial is from PIII times. Far View House has the only kiva that contains human remains, but the disordered state of this context could represent the re-deposition of elements from a disturbed skeleton rather than a primary burial deposit. An individual in kiva roof fall at the Albert Porter Site is associated with one of its unit pueblos rather than the great house Albert Porter Pueblo, which contains no human remains. The two Late PII-Early PIII midden burials nearby predate the PIII use of Wallace Ruin, regardless of the uncertainty of their association with that building. During PII times, only the IJP roomblock was utilised for primary burial deposits, for a great house prevalence of 17 percent. Ida Jean and Pueblo A are the only comparative great houses containing PIII burials, for a 33 percent rate of occurrence. When including Wallace Ruin, less than one-third (29%, 2/7) of the seven excavated MVR great houses were used for Pueblo II room depositions versus 43 percent (3/7) after AD 1180.

7.2.2 MIDDLE SAN JUAN REGION: INTRA-SITE ANALYSES

7.2.2.1 *Aztec West*

All but 17 (89%) of the Aztec West primary burials are within a roomblock MCT. Two are in the fill of Kiva B, and 15 (6 storage features, 1 grave, 8 midden) are within the extramural zone. Some 138 primary burials are dispersed among 18 percent of the approximately 200 ground-storey rooms excavated. Since Morris (1924) does not provide a map showing mortuary locations, Figure 7.3 displays the spatial organisation of the rooms used, by temporal period. Most of the surface rooms utilised are in the east and west arms of the great house. With few exceptions, mortuary contexts involve ground-floor rooms. Just two of the six Chacoan individuals are within the great house. One is within Room 2; a chamber on the east end of the curving alignment of rooms that encloses the plaza from the south. The other is in Room 43, which is on the same axial alignment relative to the east wall; however, several rooms, two kivas and a plaza "jog" separate these two rooms. Sixteen (12%) individuals in eight rooms are from either Pueblo II or Pueblo III times. In contrast, Pueblo III primary burials are much more numerous; these 120 individuals represent 87 percent of the surface room depositions. Twenty-nine (78%) chambers contain Pueblo III burials, averaging four individuals per room. Many are accompanied by Mesa Verde B/w vessels. Most rooms (13, 42%) contain a single burial but six (19%) have 10 or more. The 19 Pueblo III individuals in Room 151W comprise members of all age groups and both sexes.

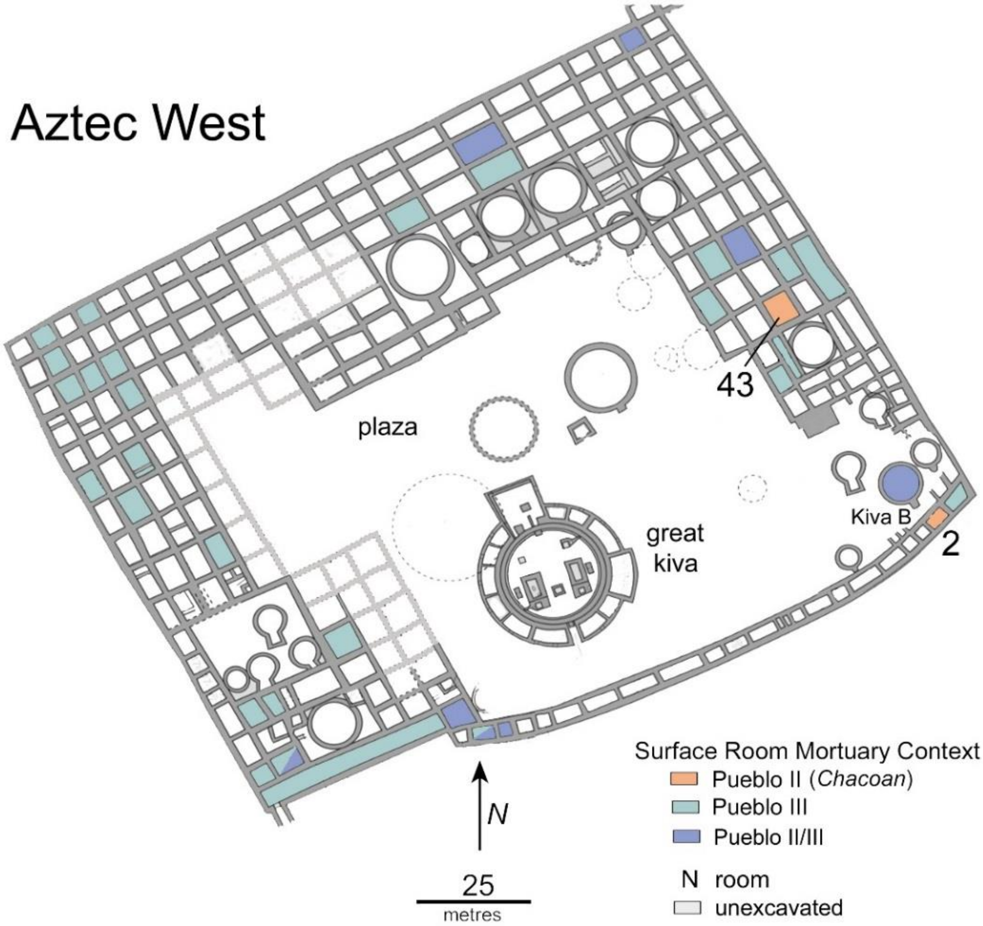


Fig. 7.3: Plan view of the distribution of rooms used for primary burial deposits at Aztec West, by period. Map adapted from the Chaco Research Archive, accessed 1.11.2016.

7.2.2.2 *Salmon Ruin*

All but four of the 71 (94%) Salmon primary burials are located within its roomblock. Each of the four extramural burials is in a pit cut through the plaza surface. The 67 individuals in a room mortuary context are within some 55% of the roughly 60 rooms excavated. The average number of individuals per room is two, though 17 rooms contain only one primary burial. The seven PIII burials in Room 127W, in the southeast corner of the building, constitute the greatest number of individuals in a single room. All but a few individuals (62, 93%) are from the post-Chacoan, San Juan occupation identified here as Pueblo III. One individual is either Chacoan or PII, and just four date to the Chacoan occupation. The four Chacoan individuals are in four rooms and thus in a 1:1 proportion. The Figure 7.4 plan map documents probable mortuary deposits by room since Espinosa's (2006) chapter does not include a map of burial locations. The floor plan displays room configuration during the San Juan occupation since almost all remains date to that interval. In view of the large number of rooms with mortuary deposits, for clarity's sake only those rooms referred to in text are labelled.

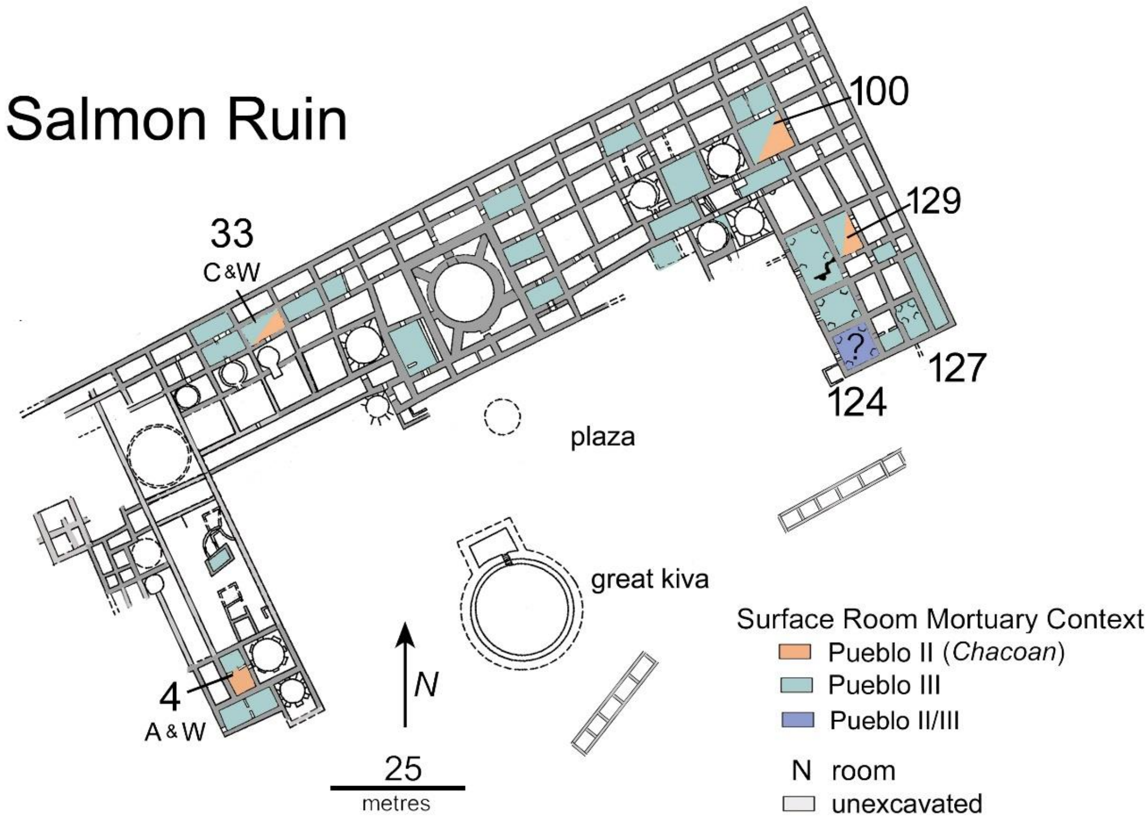


Fig. 7.4: Plan view of the distribution of rooms used for primary burial deposits at Salmon Ruin. Map adapted from Reed (2006: Fig. 1.3).

A detailed spatial analysis regarding the distribution of rooms with primary burials for Salmon or other great house sites is beyond the scope of this thesis. However, this visual inventory demonstrates that the rooms selected occur throughout the great house, apart from its unexcavated northwest section, though the eastern part of the building has the greatest concentration. With few exceptions, burials are associated with ground-storey rooms. No room contains Chacoan primary burials only. The four rooms (4W, 33W, 100W, 129) containing such contexts are not clustered. Instead, they are widely separated across the width and depth of the great house. Just two rooms separate 100W and 129W, but they are in separate room suites. Room 124W is also just two or three rooms from 129W, but there is no direct connection between these chambers.

7.2.2.3 *MSJR Synthesis*

The use of MSJR great houses for mortuary purposes is restricted to the large satellite great houses of Salmon Ruin and Aztec West. In contrast, no human remains are present in the three small great houses established within pre-existing indigenous La Plata Valley settlements at Morris 39 or Morris 41, even though they are prevalent in nearby domiciles, though most notably at M41. Thus, just two of these five sites (40%) evidence the use of the roomblock component, in both Pueblo II and III times. Some 91% (205/226) of the individuals are in a roomblock MCT. However, comparison of intramural versus extramural context prevalence is problematic. Morris (1924) did not excavate the midden at Aztec West and the San Juan River presumably removed or disturbed much of Salmon's extramural zone during extreme flooding events (Reed, 2008a). During PII times, Salmon and Aztec mortuary contexts are in rooms and extramural locations whereas their Pueblo III contexts also, on occasion, include kivas.

7.2.3 CHACO CANYON LOCALITY: INTRA-SITE ANALYSES

7.2.3.1 *Pueblo Bonito*

Ninety-nine percent of the Pueblo Bonito burials are in a roomblock context; one individual is in a storage feature. In this case, this disproportionate result regarding site component use is credible since the site's large extramural middens were extensively trenched and some 30 kivas were excavated. Yet, even though the Bonito burial population is large, by Ancestral Pueblo standards, only twelve of the 350 (3%) excavated ground-storey rooms contains a mortuary context. Almost all (94%; 92/98) of the great house depositions are within two rooms of the North Cluster (24) and the four rooms of the West Cluster (67) of the Old Bonito section of Pueblo Bonito. Six more individuals are in six rooms situated at the east margin and beyond this founding section of the great house. These Other Bonito contexts average one individual per room, whereas the North Cluster rooms average 12 individuals per room. The West Cluster average of nearly 17 individuals per room is the highest proportion observed in SJR great houses. Although AMS dates evidence a prolonged mortuary use of the North Cluster (Plog and Heitman, 2010), all Bonito individuals are associated with the Pueblo II occupation of the great house. Plan maps showing the locations of these important surface room mortuary contexts, other Pueblo Bonito rooms used for such a purpose, and other CCL great houses with rooms containing a primary burial are compiled in Figure 7.5.

7.2.3.2 *Chetro Ketl*

No primary burial deposits are within the hundreds of rooms that comprise Chetro Ketl's multi-storey roomblock, which has almost 180 ground-storey rooms. Rather, the only potential mortuary space involves Room 132, which is in the centre of the alignment of small, one-storey rooms that enclose the large plaza. This chamber is not physically associated with a residential suite, and given its location relative to a public space, may have served a communal function. Akins (1986, B.1) does not identify the scattered, partial and charred bones of two individuals in this room as primary burials. Associated artefacts consist of deer antlers, part of set of grinding stones, and a few sherds (CRA, 2015). Such items could represent mortuary goods, or they could be un-associated items in a room previously used as storage facility or a food preparation space. Potentially, these fragmentary and damaged remains represent re-depositions of bones from disturbed primary burials or even the non-mortuary deposits related to violence (Turner and Turner, 1999). However, to avoid an undercount these remains are, with reservations, classed here as Pueblo II primary burials.

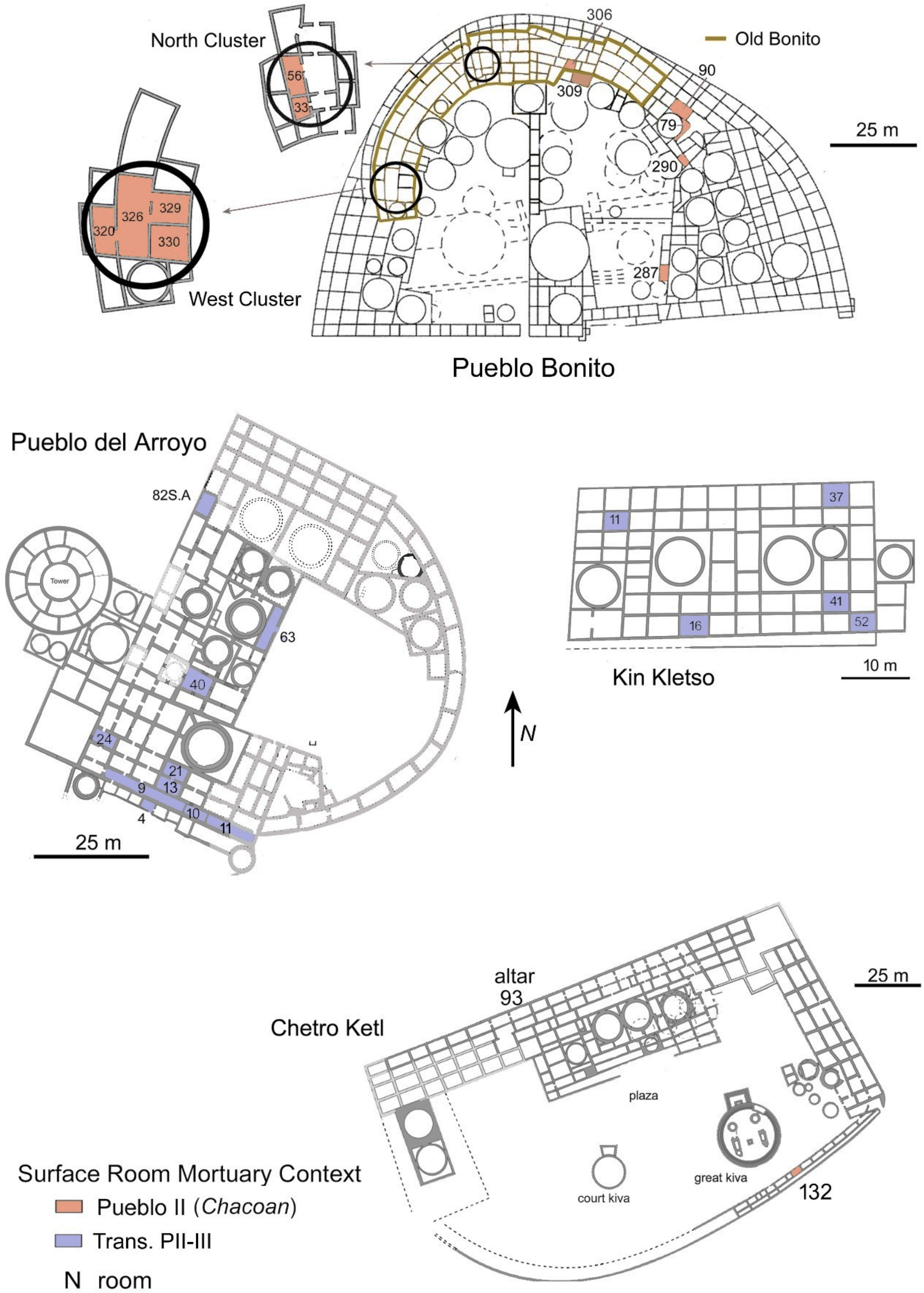


Fig. 7.5: *Plan views of the distribution of rooms used for primary burial deposits in Chaco Canyon Locality great houses. Each map is adapted from the Chaco Research Archive, December 2016.*

7.2.3.3 *Kin Kletso*

All six Kin Kletso primary burials are in rooms located in various parts of the roomblock. Five of the 65 (8%) excavated rooms contain a mortuary context, for an average of 1.2 individuals per room. No MCT is associated with the initial occupation of this small great house. Instead, each individual is associated with Chaco-McElmo or McElmo (Mesa Verde series) white ware vessels. Akins (1986:83) dates these to the Transitional PII-III (AD 1100-1175) timespan, which means that they pre-date both the appearance of Mesa Verde B/w pottery and the Pueblo III use of Wallace Ruin.

7.2.3.4 *Pueblo del Arroyo*

Ten of the 13 (77%) Pueblo del Arroyo primary burials are within the roomblock. Two are in kivas and another is in the extramural midden. The 10 roomblock depositions are in 10 rooms that constitute 20 percent of the rooms excavated, with an average of one individual per room. All date to the Transitional Pueblo II-III Period owing to their associations with McElmo B/w pottery. Several rooms are situated near the NE-SW wall, though others are in the building's central section. However, the overall spatial pattern is dispersed, even when considering that much of the north third of the building and the plaza enclosing rooms are unexcavated

7.2.3.5 *CCL Synthesis*

Four of the five (80%) Chaco Canyon great houses have at least one primary burial deposit in the roomblock, apart from Pueblo Alto. Pueblo del Arroyo has the only Ancestral Pueblo PBD in a kiva, and just four CCL individuals are in an extramural zone. This means that 115 of the 120 (96%) CCL remains are in a surface room, of which 84% (97) are from Pueblo Bonito. However, a key point is that the obverse result (4%) is obtained when the prevalence of rooms used (28) versus excavated ground-storey floors (~655) is calculated. Moreover, the inclusion of data from just one more storey reduces this already low figure by half. Most of the primary burials are from Pueblo II times. At a minimum, two (40%) great houses contain Pueblo II depositions. Although it is not known if the 15 individuals in a Kin Kletso or del Arroyo room are from Pueblo II or III times, all seem to pre-date the Pueblo III use of Wallace Ruin.

7.2.4 SAN JUAN REGION GREAT HOUSES: COMPARATIVE ANALYSES

Major variations in mortuary location sample sizes means that frequency analysis alone is insufficient to identify meaningful differences in variable combinations or proportions. The Fisher's Exact Test results provided in Table 7.4 address comparisons between two groups using three independent variables: roomblocks, rooms and roomblock primary burials, where only observed evidence is tallied. The N-1 Two-Proportion Tests results detailed in Table 7.5 pertain to specific variable combinations involving these and three additional factors: total number of suitable roomblocks, all primary burials, and the number of excavated rooms from just those roomblocks with a surface room MCT.

As performed for Wallace Ruin in Section 6.5.2, the ratio of rooms to excavated rooms serves as a scale indicator for the mortuary use of its roomblock. The question is, are there other informative ways to evaluate rooms in relation to the number of excavated rooms? The inclusion of all excavated rooms, regardless of whether or not a PBD is observed in any site location, provides baseline evidence for a surface room preference overall. Room counts based on the requirement for the presence of a burial in any site component provides insights regarding surface room preferences when a great house, or domicile, locus was deemed appropriate. Alternatively, as at Wallace, the evaluation of the Rooms:Excavated Rooms relationship among just those buildings so utilised shifts the focus to their internal patterns of use.

In great house mortuary pattern analyses, the first approach is not particularly informative: the total numbers of excavated rooms are so large that all appraisals of proportional differences between study areas are statistically meaningful. The second option has other drawbacks. As is detailed in Table 7.2, the MVR great houses of Far View House and Albert Porter Pueblo have no roomblock MCT, but they *might* have associated primary burials in an Other component locus. However, the small size of the MVR population means that inclusion of just these three individuals can have large effects on statistical significance calculations when excavated room counts are based on an associated burial in any site location. For example, in Table 7.5's N-1 Two-Proportion comparisons of inter-regional differences, the exclusion of these three individuals means that the p-value (0.318) for the MVR: MSJR (5/28 v 69/260) assay is not meaningful.

However, this relationship is significantly different (5/68 v 69/260, $p=0.006$) when the 40 excavated rooms from their associated roomblocks are included. In addition, no MSJR or CCL great house with an Ancestral Pueblo primary burial is represented solely by an Other component MCT. For consistency's sake, it makes sense to evaluate the MVR room counts in accordance with MSJR and CCL evidence, and as at Wallace Ruin; in other words, in terms of utilised roomblocks only. Therefore, the Excavated Rooms tallies in the tables below pertain only to great house roomblocks containing at least one primary burial deposit; the effects of the inclusion of burials in an Other component are noted in text. However, these three individuals are included in Block PB:All PB assays since this allocation has scant effect on findings either way.

7.2.4.1 *Diachronic change*

Fisher's Test results show that, in terms of evidence per region, only MVR great houses lack a diachronic change in mortuary use that is statistically meaningful ($p=1$). In contrast, the changes in mortuary arrays are very significant for MSJR great houses ($p=0.001$). For CCL evidence, the test assumption is that no Transitional PII-III occurrence is contemporary with Pueblo II evidence. Even so, this maximum p-value (0.043) indicates that differences in these arrays are meaningful. Also, all but two of the tests that evaluate temporal changes between archaeological regions yield p-values below the 0.05 significance threshold. The only MVR result that indicates proportional differences are not meaningful concerns PII evidence from the MSJR, which also has scant evidence of the mortuary use of rooms during this timeframe. The MSJR:CCL arrays for Pueblo III v Trans. PII-III variables are not statistically different when $p<0.05$; however, they are borderline when $p<0.10$. There is no possibility (0) that inter-regional variation is due to chance when Chaco's PII-III and PII evidence are pooled.

In terms of SJR mortuary trends regarding single proportional relationships, the prevalence disparity between individuals in a Roomblock versus the Other component is extremely skewed among those sites represented by a primary burial in any location, whether in total (90%, 327/363), or by Pueblo II (89%, 108/121), Pueblo III (92%, 186/202) or Indeterminate Pueblo II/III (82%, 33/40) designation. Not surprisingly, all N-1 Test p-values for these presence/absence proportions are zero. As is evident from the proportions identified in Table 7.5, MVR data is very scant compared to that of the other two study areas. Slightly more than half of the 18 proportional relationships tested have scores that indicate a statistically significant difference. That these significances results are distributed rather evenly through all three regions, albeit by different variable combinations, points to an overall SJR pattern involving a great deal of heterogeneity even when temporal evidence is set aside. The only non-significant result held in common pertains to the number of utilised (Blocks) versus assessable (All Blocks) great houses, which also entails the only *p*-value from an MVR relationship that exceeds 0.50.

Table 7.4: Fisher's Exact Test results for mortuary program spatial evidence arrays from MVR, MSJR, and CCL great house roomblocks (Blocks), rooms and primary burials (PB), by period. Red font designates a significant difference ($p < 0.05$).

	MVR		**MSJR**		**CCL**	
	PII	*PIII*	*PII*	*PIII*	*PII*	*T. PII-III*
Blocks	1	2	2	2	4	2
Rooms	1	4	6	60	13	15
Block PB	3	4	6	182	99	16
p : Diachronic	1		0.001		0.043	
p : MVR v MSJR	0.275	<0.001				
p : MVR v CCL	<0.001	0.010				
p : MSJR v CCL			0.006	0.108		

MVR Mesa Verde Region; MSJR Middle San Juan Region; CCL Chaco Canyon Locality; PII Pueblo II; PIII Pueblo III; T PII=III Transitional Pueblo II-III

Table 7.5: Significance test variables and results for pooled Pueblo II and III evidence regarding mortuary use of roomblocks (Blocks) in SJR great houses with a primary burial (PB) in any locus. Red font designates a significant difference ($p < 0.05$).

N-1 Two-Proportion	**MVR**	**MSJR** *proportions*	**CCL**	**MVR:MSJR**	**MVR:CCL** *p-values*	**MSJR:CCL**
Blocks: All Blocks	2:6	2:5	4:5	0.827	0.140	0.220
Blocks: Rooms	2:5	2:69	4:28	0.02	0.216	0.035
Rms: Exc.Rms	5:28	69:260	28:640	0.318	0.001	0.003
Blocks: Block PB	2:7	2:205	4:115	0	0.031	0.06
Block PB: All PB	7:17	205:226	115:120	0	0	0.085
Rooms: Block PB	5:7	69:205	28:115	0.039	0.006	0.082

7.2.4.2 *Scale of Use: Number of Roomblocks*

Eight (50%) of the assessed SJR great house sites contain a primary burial within the roomblock. A slightly different combination of eight sites has a burial in the extramural zone. The only difference is that Albert Porter Pueblo has no roomblock depositions whereas Kin Kletso has no extramural burials. Just three great houses (19%) have a mortuary context involving a kiva. Thus, as evidenced by the 8:9 proportions, SJR roomblock use is only slightly less common than the combined use of the other two site components. Of the sites with mortuary evidence, the roomblock component proportion is slightly under-represented in the MVR (2:4), balanced in the MSJR sites (2:2), and slightly over-represented in CCL great houses (4:3). That said, these results should not be accorded too much weight, considering the small numbers involved and that the addition of one individual to a category can alter these proportions. Overall, roomblock evidence is particularly reliable since most of these houses are significantly to completely excavated. Possibly, Albert Porter Pueblo's unexcavated surface rooms contain primary burials, whereas the absence of such deposits within Far View House is certain. On the other hand, the dearth of mortuary deposits in the more than 30 excavated kivas is telling since it signals the avoidance of these structures as a mortuary location option.

7.2.4.3 *Scale of Use: Number of rooms*

Of the more than 1000 SJR great house rooms excavated, slightly more than 100, or just 10 percent, have such deposits. However, this finding undoubtedly overestimates the potential for room use since it is based on the number of excavated ground-storey rooms only. This is a reasonable approach since upper-storey rooms were rarely utilised as a mortuary location. The pooling of data per region shows that the intensity of use is highest in the MSJR, even when accounting for the absence of mortuary evidence in the fifty rooms of the three Morris 39N, 39S and Morris 41 great houses. This number is roughly the same as the number of excavated rooms at Salmon Ruin where, in marked contrast, 55 percent of the investigated rooms contain at least one primary burial. Possibly, this very high prevalence is related to Salmon's singular function as a residential great house throughout its existence (Reed, 2008a) versus the limited or intermittent residential use occurring in the other 15 great houses. The same consideration may apply to Aztec West, though its residential use was less prolonged and intense. Ostensibly, the sheer number of rooms at both large great houses would have had less detrimental impacts on logistical ramifications regarding room use compared to, for example, Pueblo A.

Evaluation of the ratio of rooms with a primary burial deposit (Rms) to all rooms excavated (Exc.Rms) identifies some regional variations. The MSJR has the most rooms with an MCT (69) and the CCL (655) has the most rooms excavated. In contrast, excavated rooms in the MVR (100) constitute just a third of the MSJR count and less than a sixth of the number of CCL rooms, with a meagre amount (5) containing a burial. The *p*-value scores (0) from N-1 tests that include MSJR data (69:310) signify that its Rm:Exc.Rm proportions are completely different from those of the MVR (5:100) and Chaco Canyon Locality (28:655). In contrast, the difference between the MVR and CCL proportions is not statistically meaningful (p=0.741).

This pattern repeats in assays using data from only those great houses that have roomblock depositions. Most (70%) of the rooms with an MCT are in the two MSJR satellite great houses. Counting only those great houses with surface room depositions, MSJR great houses average 35.5 rooms per building, CCL great houses average a low-moderate seven rooms per roomblock, and MVR great houses average just 2.5 rooms. Once again, tests of the Blocks:Rooms relationship which involve MSJR data yield results evidencing a significant difference to both MVR and CCL evidence, owing to the very high number of rooms used at Aztec and Salmon. In contrast, these proportions are not significantly different regarding MVR versus CCL prevalence of rooms used per building. This unanticipated result probably is implicated in the initial perception that the CCL use of great house rooms for mortuary purposes is more distinctive owing to the far greater number of burials within its roomblocks.

7.2.4.4 *Scale of Use: Number of Primary Burials*

Ninety percent of SJR great house primary burials are in a roomblock provenience. The N-1 Two-Proportion Test result (p=0) confirms that that there is a 100% chance the proportions of individuals in a Block versus an Other locus are completely different. Nearly two-thirds of these 327 individuals are from the MSJR sites of Aztec and Salmon. Most of the rest (26%) are from Pueblo Bonito, with a remainder of just 39 (12%) individuals distributed amongst the other five great houses that have a surface room MCT. Each test involving MVR primary burial representation has a result signifying a meaningful or very meaningful difference. In contrast, the three MSJR: CCL assays are above the 95%

confidence level; however, the differences between these burial populations are statistically meaningful when $p<0.10$.

7.2.5 COMPARISON: SJR GREAT HOUSES TO WALLACE RUIN

7.2.5.1 *Pueblo II*

From the information presented above, it is evident that the use of the Wallace Ruin roomblock for mortuary purposes was not unique in Pueblo II times. The individuals dating to c. AD 1124-1150 at Ida Jean and Wallace are roughly contemporary. During its residential use, Wallace was one of six SJR great houses with a roomblock mortuary context, or possibly nine if the PII-III individuals at Kin Kletso and Pueblo del Arroyo died prior to AD 1150. Those at Salmon (established c. AD 1090) and Aztec (c. AD 1120) could pre-date this timeframe, but the earliest Pueblo Bonito depositions occurred at least a century prior to those of the Lakeview Group. In combination, Wallace and Ida Jean represent less than one-third (29%, 2/7) of the seven roomblocks used for Pueblo II room depositions. In the statistical sense, the N-1 p-value (p=0.122) for this presence/absence difference in Pueblo II roomblock utilisation in MVR great houses is not meaningful. However, this score is sufficiently low that it offers credence to the idea that a roomblock location is an aspect of the PII Lakeview mortuary program rather than a chance occurrence.

Although the numbers involved are typically small, Fisher Exact Test (3x2 contingency) results provide reasonable grounds to evaluate intra and inter-regional mortuary similarity in general terms. Comparison of the three key scale key variables highlighted above indicates scant difference between Wallace and MVR or Wallace and MSJR PII roomblock mortuary evidence. In both cases, the Wallace: MVR and Wallace: MSJR p-values are a very high 0.999, or essentially no statistically meaningful difference overall. Moreover, there is no meaningful statistical difference (p=0.373) even when one Indeterminate PII/III midden burial from Albert Porter Pueblo is allocated to Pueblo II times. On the other hand, the WR:CCL test result (0.017) identifies a statistically significance between their roomblock occurrences. Interestingly, the MSJR:CCL result (p=0.001) is even more distinctive. However, the ways in which CCL evidence is variant, or where there may be subtle dissimilarities, is not revealed through the Fisher’s test.

The chart provided in Figure 7.6 provides prevalence information for five proportion combinations pertaining to the mortuary use of the Wallace roomblock versus other great houses, per major study area. Raw numbers for each proportional relationship, and the N-1 Two-Proportion *p*-values for each test, are reported in Table 7.6 immediately below this graph. Of note, the Rooms:Block PB relationship is counterintuitive to the more common ratio of individuals per room. However, since burials outnumber rooms used for mortuary purposes (Rooms), prevalence is calculated through the obverse relationship. In other words, the lower the prevalence, the greater the number of individuals per room; moreover, equivalent numbers equate to one individual per room.

Just one of the 15 (13%) N-1 assays identifies a statistically significant difference in how roomblocks and rooms were utilised in different SJR regions compared to Wallace during its Chacoan era. Although there are proportional differences in WR:MSJR relations, none is at the level of a statistically meaningful value, by large margins. The single dissimilarity concerns the far greater number of individuals per room in Chaco great houses. The reduction in Chaco scale variables by the removal of Transitional PII-III individuals from consideration makes no difference to the test result. In the MVR dataset, all but the All PB sum is associated with Ida Jean Pueblo, which involves six of the eight individuals. Accordingly, there are no meaningful differences between the use of Ida Jean Pueblo and Wallace Ruin in Pueblo II times.

On the other hand, when relationship assays includes the ambiguous evidence from Far View House and Albert Porter Pueblo, the variation in the WR:MVR's Rooms:Exc. Rooms proportion is statistically meaningful (p=0.006). Altogether, the scores signal a comparatively more intense though not necessarily exceptional mortuary use of the Wallace roomblock. However, it is also evident that the source of variance between Wallace and the CCL evidence pertains to the 90 or so North and West Cluster depositions in just six Pueblo Bonito rooms. Overall, these values are consistent with the evidence that apart from Bonito, comparatively few individuals from each study unit are in a great house room, and, also, that very few rooms overall were utilised for such purposes during the Pueblo II Period.

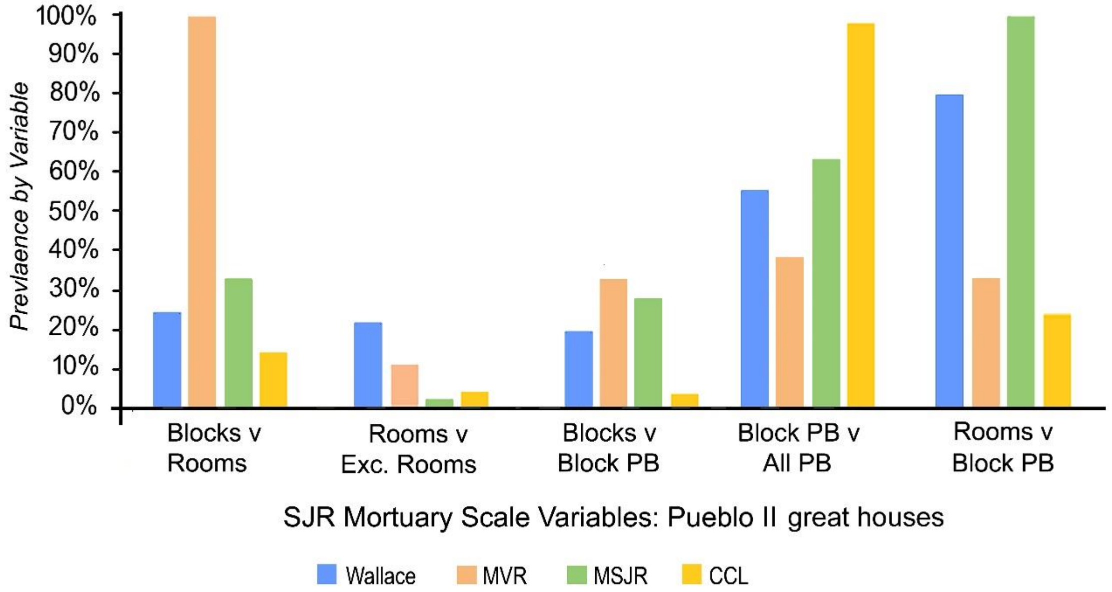


Fig. 7.6: Comparison of Wallace Ruin versus SJR scale variables pertaining to the Pueblo II mortuary use of great house roomblocks.

Table 7.6: Significance test variables and results for SJR great houses with a Pueblo II primary burial, relative to Wallace Ruin. Includes CCL Trans. PII-III. Red font designates a significant difference (*p* <0.05).

N-1 Two-Proportion	**WR**	**MVR**	**MSJR**	**CCL**	**WR: MVR**	**WR: MSJR**	**WR: CCL**
Blocks: Rooms	1:4	1:1	2:6	4:28	0.4	0.789	1
Rooms: Exc. Rms	4:18	1:8	6:260	28:525	0.569	1	1
Blocks: Block PB	1:5	1:3	2:6	4:115	1	0.747	1
Block PB: All PB	5:9	3:8	6:10	115:120	0.470	0.720	1
Rooms:Block PB	4:5	1:3	6:6	28:115	0.216	0.360	0.002

7.2.5.2 *Pueblo III*

Several aspects of the Pueblo III utilisation of Wallace are anomalous. However, this is not the case in terms of the PIII mortuary use of its roomblock in respect to the other six MVR great house roomblocks. That it is one of three roomblocks so utilised means that there is no statistically meaningful (*p*=0.606) result based on this factor alone. Interestingly, in addition to Ida Jean Pueblo, the only other MVR great house with a PIII roomblock primary burial is Pueblo A of Mitchell Springs, the nearest one beyond the Lakeview Group. Pueblo III prevalence results for the five scale variables charted above are provided in Figure 7.7; the specific proportions are presented immediately below it in Table 7.7. In this case, the CCL data pertains only to the PII-III individuals from Kin Kletso and Pueblo del Arroyo, based on the possibility that some or all are Pueblo III in age. From these results, the high proportion of individuals in a roomblock versus Other location is quite evident. However, again owing to the extreme difference in sample sizes, statistical analysis is crucial to ascertain which relationships are truly meaningful.

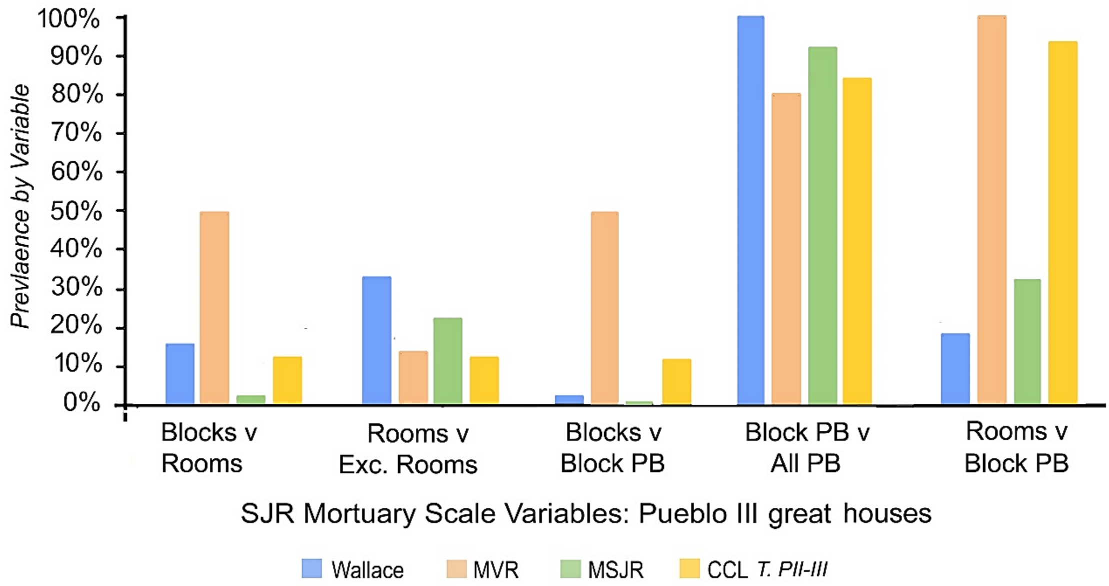


Fig. 7.7: Comparison of Wallace Ruin versus SJR scale variables pertaining to the Pueblo III mortuary use of great house roomblocks.

Table 7.7: Significance test variables and results regarding San Juan Region great houses with a Pueblo III primary burial deposit, relative to Wallace Ruin. CCL counts comprise Transitional PII-III individuals. Red font designates a significant difference (*p* <0.05).

N-1 Two-Proportion	WR	MVR	MSJR	CCL	WR: MVR	WR: MSJR	WR: CCL
Blocks: Rooms	1:6	2:4	2:60	2:15	0.285	0.252	1
Rooms: Exc.Rms	6:18	4:28	60:260	15:115	0.131	0.324	0.029
Blocks: Block PB	1:32	2:4	2:182	2:16	0.027	1	0.235
Block PB: All PB	32:32	4:6	182:197	16:19	0.021	0.107	0.022
Rooms:Block PB	6:32	4:4	60:182	15:16	0	0.109	0

Fisher's and N-1 Tests establish that the comparatively more intensive use of the roomblock at Wallace Room involves several statistically significant regional and inter-regional differences. The Pueblo III counts for Wallace are based on its MLNI of 32, in line with the arguments advanced in a prior chapter that this number represents the remains of disturbed primary burials initially deposited within the roomblock. Judd (1954) makes a similar case for the disturbed remains in the West Cluster of Pueblo Bonito, as does Marden (2011) for the North Cluster. The count of six rooms represents the West Arm/Annex chambers with *in situ* deposition evidence rather than the seven that would include the secondary mortuary treatment accorded iLink 326 of North Suite room 5a.

Fisher's tests of the three-variable arrays show a significant statistical difference overall between Wallace roomblock evidence compared to pooled data from MVR great houses of Ida Jean and Pueblo A (p=0.014). The WR:MSJR result (p=0.211) suggests a seemingly minor statistical difference involving the occurrence of roomblocks, rooms and primary burials within its two great houses. Of these three inter-district tests, the WR:CCL result (p=0.006) represents the most significant difference. However, all WR:CCL correspondences are based on the allocation of the Kin Kletso and Pueblo del Arroyo burials to the Transitional PII-III timespan. If the, reasonable, assumption is that all died before the AD 1150, then all p-values are zero. A final point is that the MSJR:CCL arrays are also significantly different (p=0.002) in Pueblo III times.

In contrast to the N-1 p-value results in the Pueblo II evidence, which are loosely clustered around 0.50, the Pueblo III distribution is rather bimodal, characterised by either high or low scores. Five scores are significantly different when $p \leq 0.05$, The same result applies when the less restrictive standard $p \leq 0.10$ is applied; in addition, two WR: MVR assays ($p \leq 0.14$) approach that standard. No WR:MVR score exceeds 0.30, which means that at a minimum, that there is a seventy percent chance that every one of the ratios tested is different to those of Wallace Ruin. This situation is not markedly dissimilar to the results involving MSJR and CCL sites, since most of those scores are also below, or just above, $p \leq 0.30$. Only three of the 10 test results from the other two study units show meaningful differences to Wallace Ruin. The WR:MSJR congruence goes to the intensity of building use, as expressed with the comparatively high number of primary burials per roomblock at Wallace, Aztec and Salmon during Pueblo III times. There is no significant difference in the WR:CCL relationship for this factor, but the greater of the two WR:CCL similarities (p=1) reflects the comparatively high number of rooms used at Wallace, Kin Kletso and Pueblo del Arroyo. As is the case for the WR:MVR proportion, the comparatively high number of individuals per room at

Wallace (5.3) accounts for the complete difference in the Rooms: Block PB (*p*=0) relationship in these CCL sites (0.94), as well as for MVR great houses (1). However, as noted above, these tests assume that the CCL evidence could date to the Pueblo III Period.

7.3 Comparative SJR Domiciles

This chapter section pertains to mortuary evidence regarding 791 primary burial deposits observed in 115 suitable SJR sites comprised of 168 domiciles. To review information presented earlier, in this study the term *domicile* is synonymous with *unit pueblo* and *kiva unit*. Owing to the size of this dataset, this chapter section synthesises information relevant to the evaluation of the mortuary use of domicile roomblocks. Only domiciles with the most robust datasets regarding roomblock use receive special attention.

7.3.1 MESA VERDE REGION

Of the 97 sites appraised, 84 are extensively excavated and 13 are adequately excavated. This evaluation of the mortuary use of roomblocks makes use of data from, by decreasing scale, 73 suitable sites, 97 domiciles, 27 roomblocks, 45 rooms and 491 primary burial deposits. The Pueblo II mortuary location evidence is compiled, per site, in Table 7.8 whereas Table 7.9 presents the Pueblo III information. As with the great house analysis, the substructure and extramural zone evidence is pooled and analysed under the Other category. Of these three major domicile subdivisions, roomblock evidence is the most reliable in terms of excavation research intensity.

7.3.1.1 *Pueblo II*

Each of the 40 Pueblo II sites with a primary burial deposit are located on the Figure 7.8 physical map of the Mesa Verde Region. Abbreviated site numbers identify those with a roomblock burial, that is, within a surface room MCT. The two domiciles closest to Wallace Ruin are 11 to 12 km distant. Moreover, as is evident from their widespread distribution, there are no site clusters in which roomblocks contain primary burial deposits. Rather, the nearest such sites are separated by at least 10 km. Although Sites 5MV1088 and 5MV34 are near the north rim of Mesa Verde, travel between them and Wallace would have been an arduous task. It would require walking westward across a rugged, canyon-laced terrain to Wetherill Mesa, thence down a steep, winding trail to the valley floor some 450 metres below.

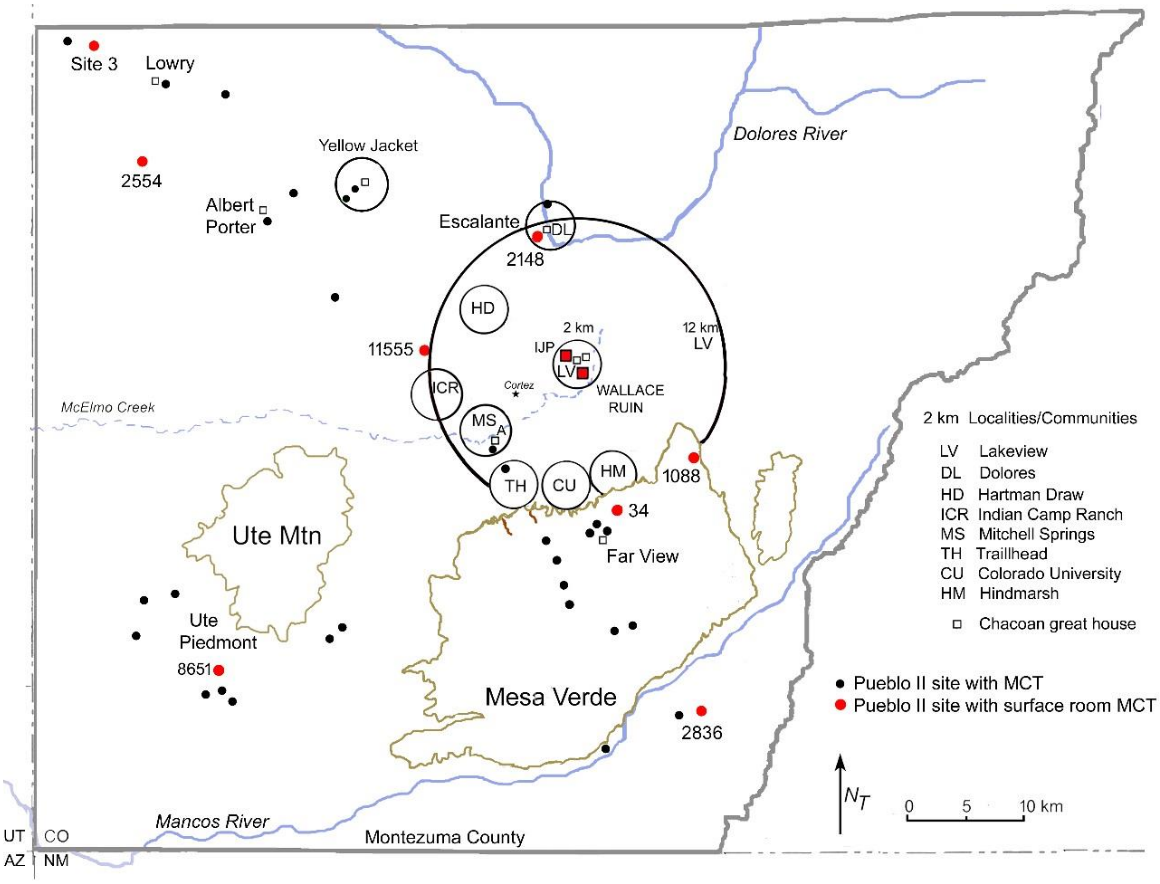


Fig.7.8: Mapped locations of Mesa Verde region Pueblo II sites with a primary burial, with special reference to those with a surface room mortuary context.

Frequency analysis at multiple scales reinforces the visual impression that there is no preference for a roomblock provenience compared to Other component locations during the Pueblo II Period. Just 11% (8) of the 71 appraised domiciles have a roomblock primary burial deposit, whereas the 45 habitations with at least one PBD in any Other location are almost six times (56%) more common. In addition, no more than 19% (8) of the 47 domiciles associated with a mortuary context have a roomblock deposition.

Table 7.8: Pueblo II mortuary locations by number of domiciles (Doms), roomblocks (Blocks), rooms and primary burials (PB) in a Block versus Other site component, by suitable Mesa Verde Region site.

Sites	Doms	Blocks	Rooms	Block PB	Other PB	Source
5DL27.B	1				4	Guthe, 1949
5MT, Site 3	1	1	1	1	3	Martin, 1938
5MT1*	1				5	Karhu, 2000
5MT10010	1				3	Leonard et al., 2005
5MT10991*	1				8	Wheeler Smith, 2009b
5MT11555	2	1	1	1	2	B.Bradley, 2010c
5MT123*	1				2	Ryan, 2015
5MT1566	1				8	von Bonin, 1936
5MT2148	1	1	1	3		Reed, 1979
5MT2336	1				2	Dohm & Gould, 1986
5MT2433	1				1	Morris, 1986
5MT2544*	1	1	1	1		Morris, 1991
5MT3*	3				20	Karhu, 2000
5MT7723	1				4	Errickson, 1993
5MT8651*	1	1	1	1	1	Leonard, 2005
5MT8766	1				1	Fetterman & Honeycutt, 1985
5MT8827	1				1	Kuckelman, 1988
5MT8899	1				4	Barnett, 1992
5MT8938	1				4	Barnett, 1992
5MT8943	1				5	Errickson, 1993
5MT9847	1				2	Hungerford et al., 2002b
5MT9869	1				1	Hungerford et al., 2002c
5MT9924	2				11	Stirniman, 2005
5MT9934	3				5	McAndrews et al., 2005
5MT9942	2				2	McAndrews, Leonard, 2005
5MT9943*	1				6	Stirniman, et al., 2005
5MT2836	1	1	1	1	4	Reed, 1984
5MT, Site 1	1				4	Reed, 1984
5MT, Site 7*	1				5	Reed, 1984
5MV1	1				2	O'Bryan, 1950
5MV1088	1	1	2	2	1	Lister & Smith, 1968
5MV1104	1				6	Lister & Breternitz, 1968
5MV1229*	1				3	Rohn, 1971
5MV1452*	1				31	Hayes & Lancaster, 1975
5MV1595	1				23	Swannack, 1969
5MV16	1				3	Lancaster & Pinkley, 1950
5MV34*	1	1	1	1	2	O'Bryan, 1950
5MV499*	1				7	Lister, 1964
5MV866	1				12	Lister, 1966
5MV875	1				1	Lister, 1965

* 12 sites with Pueblo III primary burials

On average, 1.22 rooms per roomblock contain a primary burial deposit. One primary burial per room is the most common proportion by far, occurring in all but one of the eight domiciles (88%), though 5MT2148 has three individuals in one room. Likewise, seven domiciles have only one room with a burial; 5MV1088 is the exception with two rooms utilised, though each has just one individual.

Evaluation of the prevalence of rooms used versus those excavated is particularly instructive regarding the rare use of these chambers. The typical Ancestral Pueblo house has 7 to 10 rooms (Lipe and Varien, 1999a). The total number of excavated rooms is not consistently reported in the MVR site reports appraised for this research. Considering the criteria applied for a determination of extensive excavation, five excavated rooms per domicile is a plausible estimate. The application of the formula "*e*R x D=xR", in which the estimated number of excavated rooms (*e*R) is multiplied by the number of assessed domiciles (D), yields a gross estimate of excavated (xR) rooms. Interrogation of this method using data from known excavated room counts for MSJR domiciles provides confidence that the standard of five rooms per domicile is credible for MVR calculations since the application of the above formula yields an average of 5 to six excavated rooms per domicile, even though just two or three rooms were excavated in several La Plata Valley sites. Thus, the calculation for Pueblo II MVR domiciles (5 rooms x 71 domiciles) yields an estimated 355 excavated rooms. In such case, a mere 3% (9/355) of excavated rooms has a primary burial deposit.

Location prevalence in terms of number of primary burials is remarkably consistent with the above projected use of rooms. In this case, just 5% (11/220) of Pueblo II individuals are in a surface room MCT. Instead, the clear majority (84%, 209/220) are in the extramural zone, mostly within a midden (162; 88%); several are in graves (18) and three individuals are in a storage feature. Subsurface structures (25) also have more primary burials than roomblocks, with slightly more than twice (11%) the number of surface room depositions. Of these, 14 are within a kiva's main chamber, a wall niche, its ventilator system, or an associated tunnel. Eleven depositions are in a pit-house or a small pitroom, and two infants are within disused post-holes.

7.3.1.2 *Pueblo III*

The mapped locations of all 33 MVR Pueblo III sites with a primary burial deposit are displayed in Figure 7.9 below. As in the previous figure, site numbers signify those with a surface room mortuary context. Only two localities have multiple sites in which the roomblock component is utilised. One small cluster is at 5MT1 and 5MT3 of Yellow Jacket Hamlet, some 18 km distant from Wallace Ruin. The other cluster encompasses three Wetherill Mesa (MVNP) cliff dwellings situated some

500 to 1500 metres apart. Spruce Tree House (5MV640) is even more distant and separated from this mini-cluster by several deep, narrow canyons.

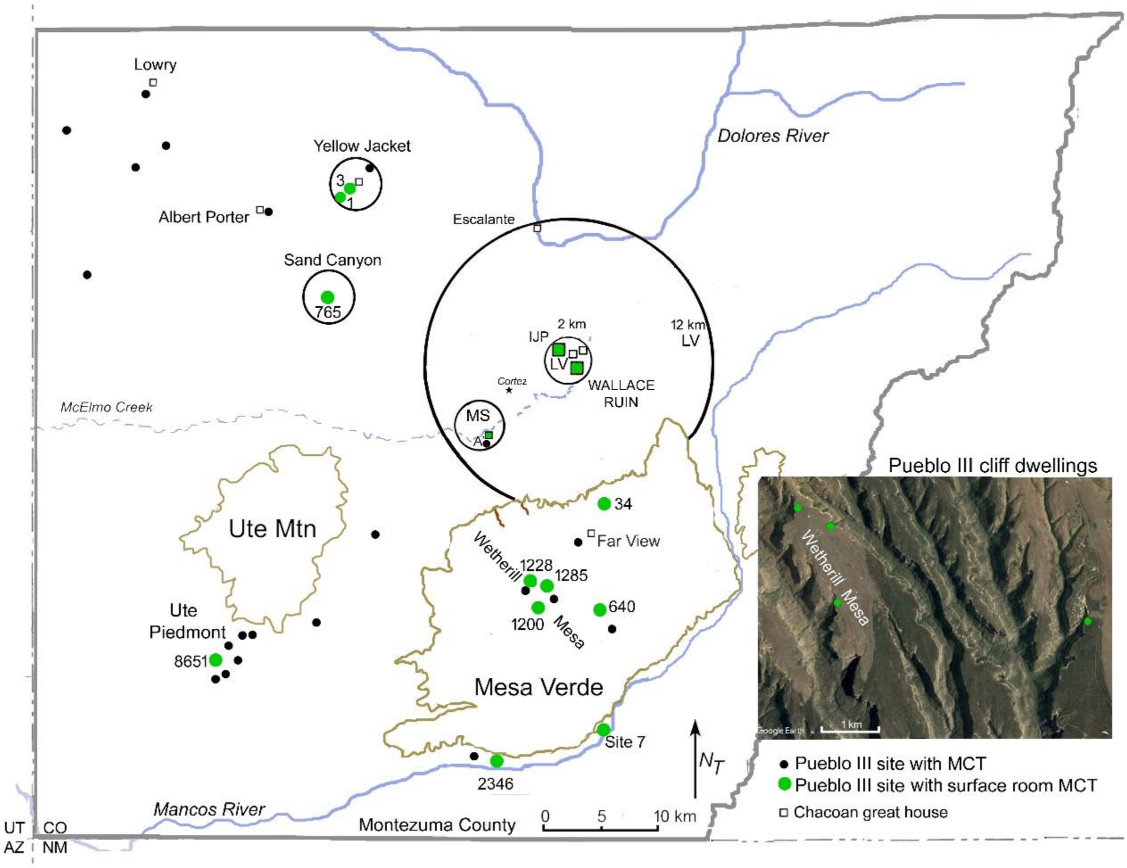


Fig.7.9: Mapped locations of Mesa Verde region Pueblo III sites with a primary burial, with special reference to those with a surface room mortuary context.

The occurrence of primary burial deposits in the roomblock component is also comparatively unusual during Pueblo III times, and again by all measures. From the information compiled in Table 7.9, only 20% (19/94) of the total number of assessed domiciles have a roomblock PBD whereas half of them (47) have a primary burial located elsewhere. Considering only the 50 domiciles with PBD evidence, roomblock prevalence (38%, 19/50) is substantially less than the very high frequency (94%, 47/50) observed in the Other component.

In total, 36 rooms with a primary burial are distributed among 28 domiciles, for an average of 1.3 rooms per domicile. Using the same method described above, an estimated 480 surface rooms, from the 96 domiciles assessed, are excavated. By this admittedly rough approximation, the prevalence of rooms used (39/480) is a low eight percent. Even this figure is almost certainly an overestimate considering that several of Mesa Verde's large cliff dwellings, which contain several hundred rooms alone, are completely excavated.

Table 7.9: Pueblo III mortuary locations by number of domiciles (Doms), roomblocks (Blocks), rooms and primary burials (PB) in a Block versus Other site component, by suitable Mesa Verde region site.

Sites N=33	Doms N=50	Blocks N=19	Rooms N=36	Block PB N=53	Other PB N=198	Source
5DL, SP	1				9	Prudden, 1918
5MT1*	3	1	2	2	6	Karhu, 2000
5MT10207	1				1	Errickson, 1993
5MT10991*	1	1	1	1	2	Dove & Dove, 1997
5MT10991R1	1				1	Prudden, 1914
5MT123*	1				1	Ryan, 2015
5MT13403	1				2	Luebben, 1982
5MT2	1				1	Wilshusen & Lekson, 2003
5MT2343/5	1				5	Nordby, 1974
5MT2346	1	1	1	1	3	Nordby, 1974
5MT2519	1				3	Morris, 1991
5MT2544*	1				1	Morris, 1991
5MT2564	1				1	Hungerford et al., 2005
5MT2715	1				1	Luebben, 1985
5MT3*	7	4	13	22	35	Karhu, 2000
5MT4104	1				23	Martin, 1929
5MT765	2	1	1	1	7	Bradley, 1998
5MT7704	1				1	Errickson, 1993
5MT8651*	1	1	1	1		Leonard, 2005
5MT8943	1				2	Errickson, 1993
5MT9541	1				1	Kleidon, 2005
5MT9933	1				1	Kleidon, 2005
5MT9943*	1				8	Stirniman et al., 2005
5MT, Site 7*	1	1	2	2		Reed, 1944
5MV1200	7	4	3	5	27	Cattanach, 1980
5MV1228	1	1	4	5	4	Rohn, 1971
5MV1229*	2				32	Rohn, 1971
5MV1285	1	1	2	2	9	Nichols, 1972
5MV1452*	1				3	Hayes & Lancaster, 1975
5MV34*	2	2	5	7	5	O'Bryan, 1950
5MV499*	1				2	Lister, 1964
5MV522	1				1	Fewkes, 1920
5MV640	1	1	1	4		Fewkes, 1909

* 12 sites with Pueblo II primary burials

The rooms with primary burials average 1.43 individuals per room. Just above half (22/36) of the rooms contain a single individual, seven have two individuals and three have three primary burials. Room 1 of Site 5MT3 of Yellow Jacket Hamlet has four individuals, as does Spruce Tree House of MVNP. However, these sites are many kilometres distant from one another:

7.3.1.3 *Sites 5MT3 and 5MV34*

Sites 5MT3 and the previously identified 5MV34 are the only sites having multiple rooms used in multiple domiciles. Most of these rooms contain one primary burial. However, kiva unit 3.17 of 5MT3 has three rooms with multiple burials and 3.73 has two rooms with multiple burials. The Figure 7.9 compilation below documents these and other 5MT3 rooms with a PBD as well as those from Site 5MV34, which has two rooms with two burials in addition to three rooms with one individual each. 5MV34 is one of two MVR sites with both Pueblo II and III surface room depositions. The other is 5MT8651 of the Ute Piedmont, but each timespan involves only one room with one individual. The distribution of rooms used at Site 5MV34 has a dispersed appearance, though there is a pronounced use of the "back rooms" that tend to be used for storage rather than habitation. Factors related to the 5MT3 room distribution pattern are addressed in the next chapter.

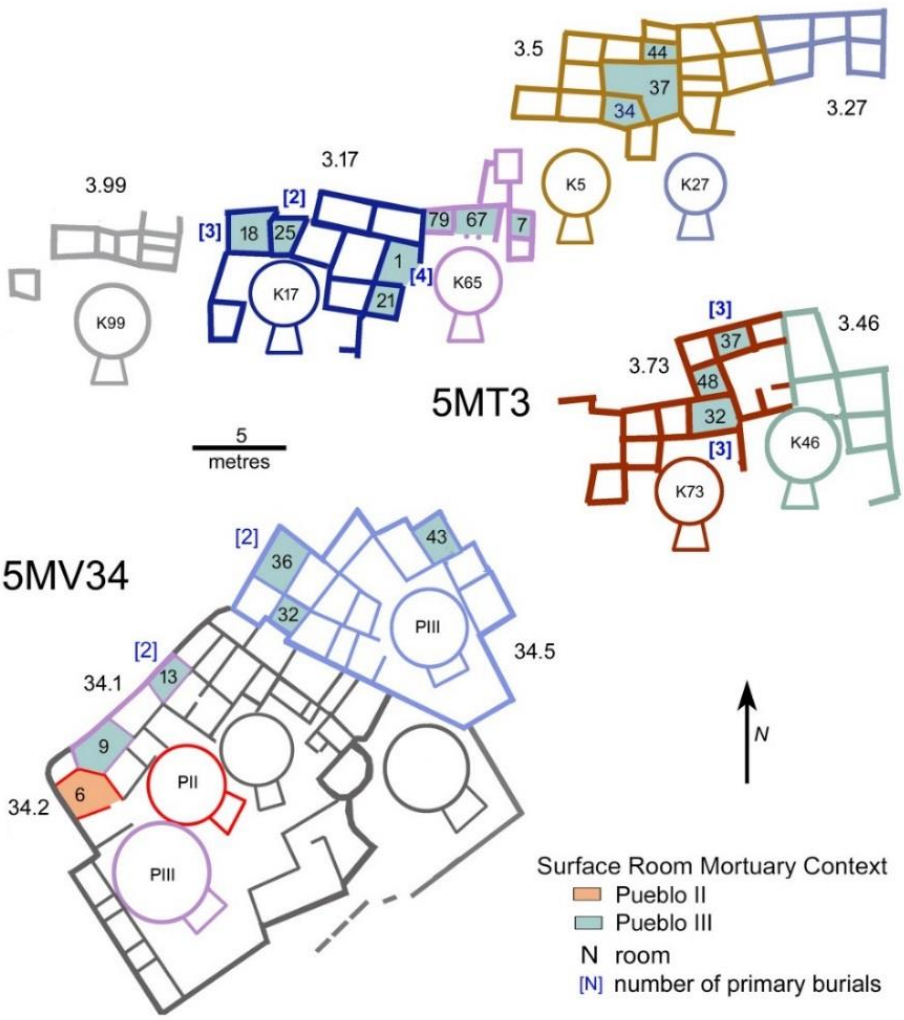


Fig. 7.10: Locations of primary burial deposits in 5MT3 and 5MV34, by period and domiciles. One burial per room unless noted otherwise. (Top: adapted from Karhu, 2000: Fig.1.5; Bottom: adapted from O'Bryan, 1950: Fig. 25).

The Roomblock:Other proportion (53:198) is also rather unbalanced in terms of number of primary burials, with just 21% (53/251) in a surface room MCT. Most (65%, 163) of the individuals are in the residential midden. However, in contrast to Pueblo II trends, roomblock burials outnumber those in a subsurface structure, which contain only 14% (35) of the Pueblo III individuals.

7.3.2 MIDDLE SAN JUAN REGION

This evaluation of the mortuary use of roomblocks makes use of data from 17 suitable sites, 35 of 38 assessed domiciles, 22 roomblocks, 61 rooms and 300 primary burials. In total, about ninety percent of the suitable domiciles assessed have at least one primary burial. As above, the substructure and extramural zone evidence is pooled and analysed under the Other category. Of these three major domicile subdivisions, roomblock evidence is the most reliable in terms of excavation research intensity. However, it is noted once again that this evaluation focused upon just those sites with a Chacoan connection or which are situated between the MSJR's satellite great houses and Wallace Ruin. The locations of roomblocks with a primary burial deposit are plotted in Figure 7.11 by site or locality. Table 7.10 provides details regarding the distribution of primary burials in a Roomblock, Room or Other component, per domicile and period. Except for the Aztec West Annex (AzAnnex), all sites have both Pueblo II and Pueblo III occupation components.

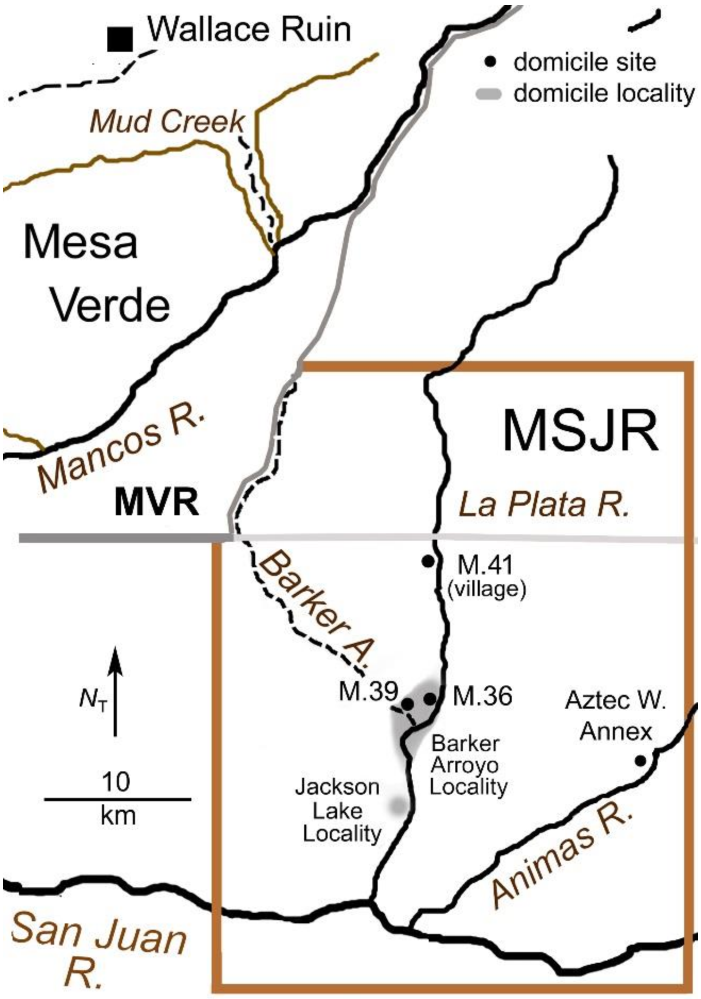


Fig. 7.11: Distribution of assessed MSJR domiciles with a Pueblo II or Pueblo III primary burial deposit in a roomblock, relative to Wallace Ruin.

Table 7.10: Mortuary locations by number of domiciles (Doms), roomblocks (Blocks), rooms and primary burials (PB) in a Block versus Other site component, by suitable Middle San Juan Region site and period.

Sites	Doms	Blocks	Rooms	Block PB	Other PB
			Pueblo II		
(N=11)					
LA37592	1				2
LA37593*	1				4
LA37594	1				1
LA37598	1				1
LA37599	1				8
LA37601	1				5
LA37605	1	1	1	1	1
LA65029*	1	1	1	1	
LA65030	1				7
Morris 39	3	1	1	1	40
Morris 41	2	2	3	5	28
Total	14	5	6	8	97
			Pueblo III		
(N=8)					
LA37592	1	1	1	1	2
LA37599	1				1
LA37601	1				4
LA65030	1	1	1	3	6
AzAnnex*	4	1	2	2	21
Morris 36	1	1	1	6	4
Morris 39	3				2
Morris 41	14	14	52	92	19
Total	26	18	57	104	59
			Indeterminate PII/III		
(N=3)					
LA37592				1	2
LA37601					1
Morris 41	1		5	12	16
Total	1		5	13	19

*Single temporal component, PBD; Sources: LA sites:Martin and colleagues (2001)
AzAnnex: Morris (1924); Morris 36, 39, 41: Morris (1939)

7.3.2.1 *Pueblo II*

Pueblo II roomblock depositions are comparatively rare in the MSJR. About one-third (5) of the 14 domiciles, from 12 sites (25%), has a surface room MCT. On the other hand, 94% of these domiciles have at least one PBD in another site component. Despite extensive excavations beyond its small roomblock (Martin et al., 2001:158), only LA65029 lacks a primary burial in the Other category.

The six surface rooms utilised are in five domiciles, which average somewhat more (1.33) than one individual per room. However, three domiciles are represented by one room each, with one burial per room. The three rooms at Morris 41 are in 41.K8 and 41.7a, within four of its six Pueblo II domiciles. Based on the actual number of excavated MSJR rooms extant during Pueblo II times, some seven percent (6/85) contain a primary burial deposit.

Interestingly, this result is equivalent to the prevalence of Pueblo II individuals in a surface room context, which is also a low seven percent. Instead, approximately half of the individuals (58) are in a midden, six are in a grave, and 12 are in a storage feature. Both Morris 39 and Morris 41 have just three individuals each in a subsurface structure context, whereas 20 primary burials are present among six La Plata domiciles.

7.3.2.2 *Pueblo III*

During Pueblo III times, about 60% (18) of the 26 domiciles, or approximately half (8/17) of the suitable sites, have a primary burial deposit in a roomblock. In slight contrast, all domiciles with a PBD have at least one individual in an Other Component provenience. Four sites with a roomblock burial are represented by a single domicile each, in marked contrast to the 14 utilised at Morris 41. The 57 surface rooms with a mortuary context are distributed among 18 roomblocks, for an average of roughly three (3.16) rooms per domicile, or slightly less than two (1.82) in terms of all suitable domiciles. By actual count, 234 rooms in these 26 roomblocks are fully excavated, which means that 24% (57/234) of these contain a primary burial. This is a moderate result; however, 52 rooms are from a single site. When data from Morris 41 are excluded, just about 5% (5/98) of the excavated rooms contain a primary burial.

Some two-thirds of the Pueblo III individuals (104) are in a roomblock location, averaging four individuals per domicile and 1.8 individuals per room. Consistent with the trends noted above, almost all (88%) are from Morris 41. Setting M41 evidence aside, 13 MSJR domiciles contain 12 individuals, or about one individual per domicile and 2.4 individuals per room. Individuals in Other component proveniences are distributed rather equally between the extramural zone and subsurface structures. Given the significant effects of the evidence from

Morris 41, and its nearer proximity to Wallace Ruin versus other MSJR sites, a closer look at its mortuary trends is worthwhile.

7.3.2.3 *Morris 41*

Morris (1939) identifies fifteen separate buildings as domiciles in addition to the Building 16 great house. However, to evaluate diachronic change in mortuary location trends, the Pueblo II and III unit pueblos that constitute a single building are distinguished herein. Plans of the buildings with mortuary evidence, and the Building 16 great house, are provided in Figure 7.12. This compilation does not provide an accurate picture of the spatial relationships of these structures and other domiciles, which Morris (1939:86) documents in his Figure 25. Morris's, amended, building labels (i.e., 41.5 for Building V) identify specific domiciles, either because a kiva was not located or because Morris does not report its designation. Letters (a and b) designate separate domiciles within a building. In addition, Morris does not provide a designation for the demolished structure that he merely describes as beneath Building III. This building is denoted here as 41.K8, based on its potential association with the nearby Kiva 8. Accordingly, as determined here, M41 has 18 excavated unit pueblos. Other than 41.K8, all were erected or used in Pueblo III times. Six buildings (41.K8, 41.5a, 41.7a, 8, 11 and 10, not depicted) have a Pueblo II component.

Multiple scales of analysis demonstrate that the mortuary use of the Morris 41 roomblocks is most pronounced compared to San Juan Region sites, whether great house or domicile. Sixteen (89%) of its 18 excavated domiciles contain at least one of its 176 primary burial deposits. These MCT are distributed among nearly half (58; 45%) of its 130 or so excavated rooms, averaging 3.6 rooms per domicile and 11 individuals per room.

Only Building 41.K8 lacks a Pueblo III individual, and two rooms in Building 41.7a have both Pueblo II and Pueblo III burials. Otherwise, all but four rooms contain Pueblo III mortuary contexts. Buildings 41.4 and 41.7 contain the greatest concentration of rooms used, though Building 7 has nearly twice the number of primary burials, with 56 versus 24. Interpretations regarding the extensive use of these rooms are deferred to the next chapter since that evaluation of room use incorporates the critical factor of vertical provenience and room availability.

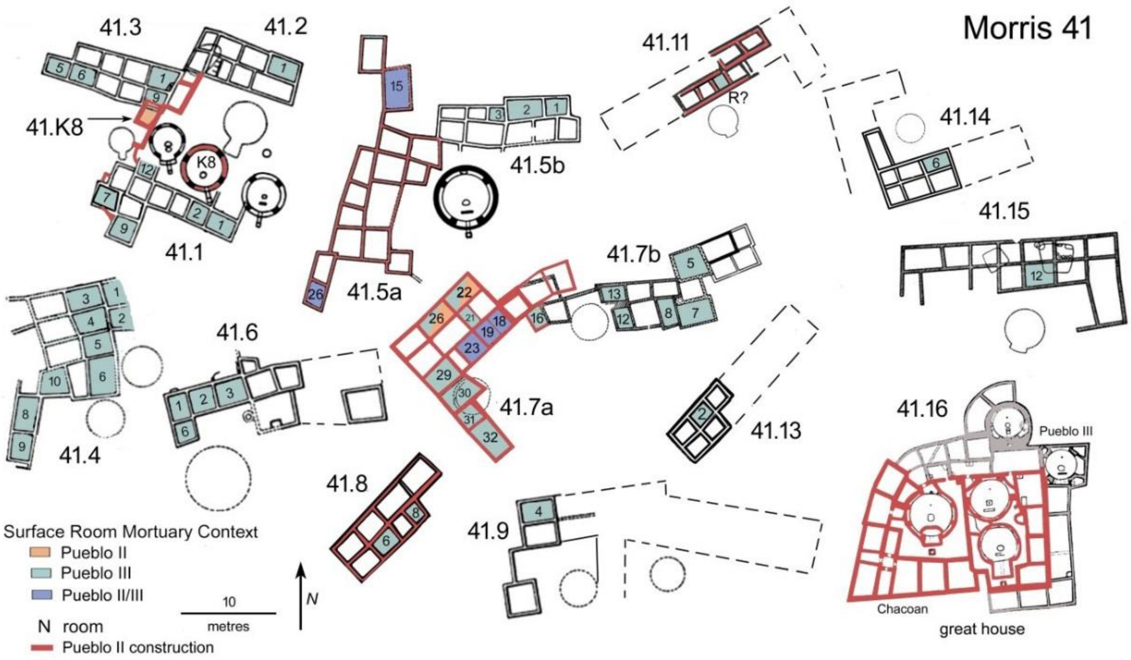


Fig. 7.12: Compiled plans of 16 domiciles and the great house Morris 41, documenting the occurrence of mortuary contexts per building, by period.

As noted by Morris (1939:115) and Martin and colleagues (2001:35), the diachronic change in the use of roomblocks versus other domicile locations at Morris 41 is distinctive. Just 15% (5/33) of the Pueblo II individuals are in a surface room context compared to the nearly 85% (28) in one of the Other proveniences. Most (21, 64%) are in an extramural midden. In marked contrast, 84% (92) of the 111 Pueblo III remains are in a roomblock whereas a mere 5% (19) are in an extramural grave or midden. Unfortunately, such direct comparisons are problematic since the extramural zone received far less attention than roomblocks and kivas.

The value of this detailed intra-site component analysis of the Morris 41 evidence at the scales of domicile and rooms is that it sidesteps this excavation bias. Not surprisingly, the analysis of comprehensively excavated study units substantiates the extreme temporal disproportion regarding the increased use of surface rooms. Just five of the 98 Pueblo II and III burials in a roomblock are Pueblo II in age. Only two of the nine kivas excavated contain a primary burial deposit. The presence of just three individuals in two PII kivas signals the avoidance of such structures as a mortuary location option. Considering the intense use of roomblocks for the disposal of individuals accompanied by Mesa Verde B/w pottery, it is noteworthy that each is from Pueblo II times.

7.3.3 SAN JUAN REGION DOMICILES: COMPARATIVE ANALYSES

Of the 206 suitable SJR domiciles, which include 25 unit pueblos from MVR Supplemental sites, 137 (67%) have a primary burial located within one of its three major site components. Twelve unit pueblos have depositions from both Pueblo II and III times, for an adjusted total of 125 domiciles. Forty-six (37%) of these have a primary burial deposit in a roomblock (Block) context. By count or estimation, some 1060 rooms are excavated in domiciles with a mortuary context in any location. Of these, 106 (10%) rooms contain at least one primary burial. In total, 795 primary burials are within the bounds of a domicile, of which 191 (24%) are in a roomblock, or surface room. However, 132 (66%) individuals are from just two sites: 5MT3 and Morris 41.

7.3.3.1 ***Diachronic Change***

In terms of San Juan Region trends, the diachronic changes in mortuary location choices that occurred in great houses also took place within MVR and MSJR domiciles. Multiple lines of evidence point to an increase in the use of the roomblock component for primary burial deposits over time. Six N-1 tests results reported in Table 7.11, involving different combinations of three scale variables, demonstrate that PII and PIII roomblock utilisation regarding pooled MVR v MSJR mortuary evidence is so dissimilar that test results approach zero in all but one case. As performed for great house assays, the domiciles involved comprise only those with at least one primary burial. Further interrogation of MVR v MSJR differences per temporal component confirms that all changes are unidirectional. No PII test is statistically significantly different, in contrast to the PIII results. The removal of the data from Morris 41 effectively shows that the very intense use of Morris 41's 15 domiciles contributes much of this inter-regional difference both during Pueblo III times and overall. The resulting differences involving primary burials is related to the greater number of individuals within MVR roomblocks and individuals per room. On the other hand, the infrequency of scores approaching 1, or no statistically significant difference, confirms that the oft-mentioned (Goldstein, 2001; Schlanger, 1992; Stodder, 1987) heterogeneity in Ancestral Pueblo mortuary practices applies to spatial patterns regarding the use of the domicile roomblock component.

Table 7.11: Significance test variables and results regarding mortuary evidence from roomblocks in MVR versus MSJR domiciles with a primary burial in any locus; in total and by temporal period, and when excluding Pueblo III data from Morris 41. Red font designates a significant difference (p <0.05).

N-1 Two-Proportion	PII v PIII	Pueblo II	Pueblo III	Sans M41, PIII
Blocks: All Blocks	<0.001	0.137	0.010	0.766
Blocks: Rooms	0.0101	1	0.043	0.509
Rooms: Exc.Rms	0	0.355	<0.001	0.040
Block PB: All PB	0	0.358	0	0.211
Blocks: Block PB	0.001	0.644	0.009	0
Rooms: Block PB	0.066	0.726	0.114	0.007

7.3.3.2 *Scale of Use: Number of Roomblocks*

Less than one quarter (22%, 46/206) of the suitable San Juan Region domiciles have a primary burial in a roomblock context. The 58% (22/38) occurrence of assessed roomblocks with a PBD in MSJR habitations is substantial compared to the total MVR frequency of 22% (27/122), which includes habitations from Supplemental sites. As discussed in Section 4.3.3.2, this larger of the two MVR datasets comprises a more comprehensive, and statistically reliable (90% confidence) sample of assessed, suitable domiciles. The extent to which this disproportion reflects excavation and sampling bias is unknown but may have a considerable effect on these findings. However, similar results (63% v 28%) are obtained when considering only domiciles with a primary burial in any location (22/35 v 27/97). The differences in both proportional relationships are statistically meaningful (p=0.001; 0.002).

7.3.3.3 *Scale of Use: Number of Rooms*

Despite some prominent exceptions, SJR domicile rooms were infrequently used as primary burial deposit spaces. In comparison to the total number of rooms excavated, just 12% (108/933) contain a primary burial. Domiciles with a MCT in any location average less than one room (108/137) used per roomblock. Furthermore, this very low rate of occurrence is decreased even further (58%) when calculated in terms of all suitable domiciles (108/206). Morris 41's disproportionately high number of rooms used for primary burial deposits (53), strongly affect inter-regional room use comparisons. On the other hand, though the 13 rooms used at 5MT3, which constitute one-third of the MVR rooms with an

MCT, skews its regional proportions in this regard, the exclusion of its data (13/58) has no meaningful effect on this SJR proportional relationship (*p*=0.775).

7.3.3.4 *Scale of Use: Number of Primary Burials*

Roughly one quarter (24%, 191/795) of SJR primary burials are within the roomblock component. In line with the statistical tests reported above, the MVR and MSJR proportions of individuals per room are similar, averaging 1.4 (64/45) and 1.7 (112/63) individuals per room, respectively. Middle San Juan domiciles average 5.5 (112/22) individuals per roomblock versus whereas the MVR proportion is half that at 2.4 individuals per roomblock. As above, the difference is largely due to the Morris 41 mortuary program, which averages a very high count of 11 individuals per roomblock.

7.3.4 COMPARATIVE ANALYSES: GREAT HOUSES VERSUS DOMICILES

7.3.4.1 *Inter-regional comparisons*

The analytical distinction between great houses and domiciles is, to some extent, an artificial construct. All great houses, including Pueblo Bonito, had a residential component of some size, including a substantial occupation from the outset at Salmon Ruin. During Pueblo III times, great house activities seem to have revolved around everyday life, except in the Lakeview Group. Thus, it is worth evaluating potential differences between great houses and domiciles in terms of the three-variable mortuary arrays. From the results displayed in Table 7.12, the only significant difference involves the disparity between the use of Ida Jean and Pueblo A versus Mesa Verde Region domiciles. Wallace is evaluated separately. However, the MVR great house evidence is so scant that the probability is that neither MVR result is reliable.

Table 7.12: Fisher's Exact Test results for roomblock, room and primary burial occurrence in SJR great house versus domicile mortuary locations, by region and by pooled evidence. Red font designates a significant difference (*p* <0.05).

	MVR: GH v D	MSJR : GH v D	MVR:MSJR, pooled
Pueblo II	0.6	0.438	0.744
Pueblo III	0.002	0.730	0.191

GH great house; D domicile

7.3.4.2 *Wallace Ruin versus SJR Domiciles*

In accordance with Pueblo II tests regarding roomblock use in SJR great houses, the test results for Fisher's Exact Test and N-1 tests indicate that there is also no statistically significant difference in the Pueblo II domicile mortuary evidence relative to Wallace. In addition, Fisher's results (*p*=MVR: 0.581, MSJR: 0.686) show no significant differences between Wallace and any of the major archaeological study units in respect to number of roomblocks or rooms used, or by primary burials in a room MCT. In slight contrast, N-1 Tests identify just a few points of significant variation among the arrays provided in Table 7.13.

Table 7.13: Significance test variables and results regarding SJR domiciles with a Pueblo II primary burial in any location, relative to Wallace Ruin. Red font designates a significant difference ($p<0.05$).

N-1	**WR**	**MVR**	**MSJR**	**WR:MVR**	**WR: MSJR**
Two-Proportion		*proportions*			*p-values*
Blocks: Rooms	1:4	9:8	6:5	0.062	0.123
Rms: Exc.Rms	4:18	9:282	6:117	0.002	0.010
Blocks: Block PB	5:9	11:220	8:105	1	0.004
Block PB: All PB	1:5	8:11	5:8	0.876	0.578
Rooms: Block PB	5:4	11:9	8:6	0.357	0.384

On the other hand, and also consistent with the MVR great house results, the Wallace ratio concerning Rms:Exc.Rms is significantly different compared to this relationship in domiciles. This result is an indicator of the disproportionate number of rooms utilised in a single roomblock at Wallace (4) compared to the nine rooms from all domiciles with at least one primary burial. Thus, in combination with the other primary burial indicators, it seems that the proportions of MVR individuals per domicile roomblock, and burials per room, are of a similarly low intensity during Wallace's initial use. The Wallace: MSJR test results are similar to the WR:MVR significance test results in terms all variables except the combination that evaluates the prevalence of roomblock primary burials relative to the entire burial population. As noted in the MSJR discussion, this result may reflect the emphasis on subsurface structure/extramural excavations in the Barker Arroyo/Jackson Lake localities at the expense of roomblock investigations.

The much better represented Pueblo III variable combinations are converted to percentages and displayed in Figure 7.13 for comparative purposes. For ease of reference, the number of occurrences by variable and test combinations are provided in Table 7.14, along with N-1 *p*-values. The chart hints at the differences between the PIII mortuary program at Wallace versus other SJR domiciles with at least one burial.

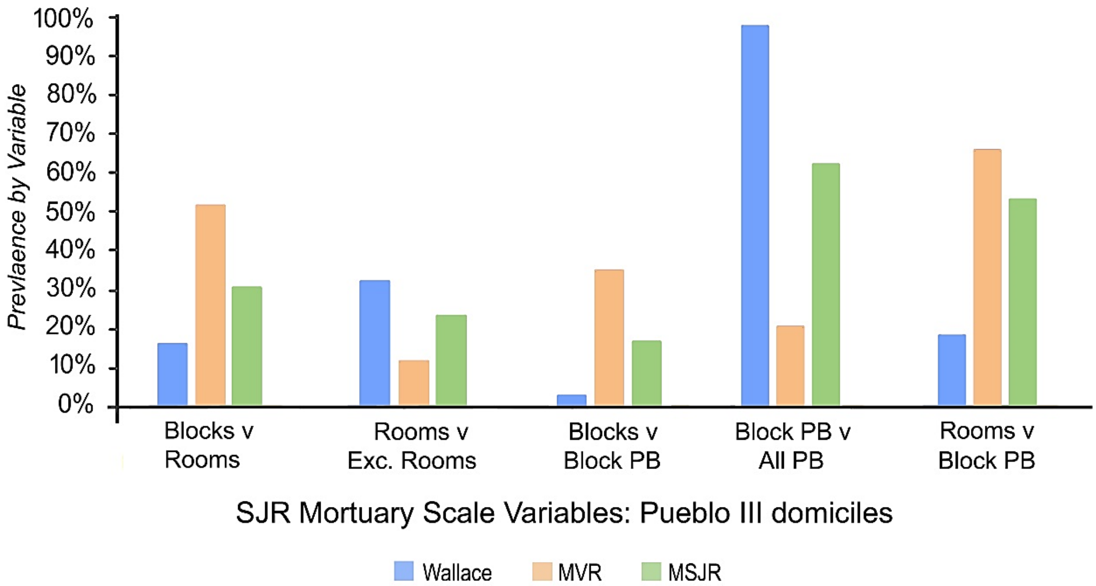


Fig. 7.13: Comparison of Wallace Ruin versus SJR scale variables pertaining to the Pueblo III mortuary use of domicile roomblocks.

Table 7.14: Significance test variables and results regarding the Pueblo III mortuary use of roomblocks in SJR domiciles with a primary burial, versus Wallace Ruin. Red font designates a significant difference (p <0.05)

N-1 Two-Proportion T.	WR	MVR *proportions*	MSJR	WR:MVR	WR: MSJR *p-values*
Blocks: Rooms	1:6	19:36	18:57	0.105	0.452
Rms: Exc.Rms	6:18	36:300	57:234	0.009	0.397
Blocks: Block PB	1:32	19:53	18:104	<0.001	0.043
Block PB: All PB	32:32	53:251	104:163	0	0.005
Rooms: Block PB	6:32	36:53	57:104	0.001	<0.001

In contrast to the Pueblo II results, Fisher's Test results of the three key scale variables establish with almost complete statistical certainty that the Pueblo III mortuary program at Wallace is completely different to the patterns observed in domiciles situated within the MVR (0) and MSJR (0.026) study areas. In addition, the information presented in Table 14 makes evident that all N-1 Two-Proportion *p*-values regarding various combinations of these variables are very significantly different, with few exceptions. Wallace varies considerably from all MVR variable combinations, and though the difference in the ratio of rooms to roomblocks is not statistically significant, it is on the verge of such a determination. The two MSJR proportions that are generally similar to Wallace's reflect the intensity of room use at Morris 41.

7.3.5 KEY FINDINGS

The numbers involved are sufficiently robust to establish that San Juan Region inhabitants construed roomblocks, and thus surface rooms, as a potential mortuary location option regardless of site type. Moreover, findings drawn from evidence compiled in this larger dataset are consistent with Schlanger's (1992) identification of a diachronic change in roomblock use, which increases between Pueblo II and Pueblo III times. This finding is all the more noteworthy considering that in many of the sites assessed the roomblock component was the most thoroughly excavated of the three site components. Although scholars have interpreted the Ancestral Pueblo mortuary pattern as residential in nature, the more substantial dataset employed in this study provides strong empirical evidence that supports that longstanding view.

This large-scale and multi-variable investigation also confirms that there is no overarching pattern regarding the mortuary use of the roomblock component in SJR great houses or domiciles, in similar vein to Schlanger (1992). Several great houses have no associated primary burials, and a few have such deposits only in a subsurface structure or the extramural zone. Roomblock depositions can involve dozens of primary burials, or just one or two. Building size is not necessarily a key factor. The very large Chetro Ketl has only one, potential, primary burial whereas the small great house of Ida Jean Pueblo has at least five. Moreover, even though MSRJ and CCL monumental structures contain large numbers of primary burials, their depositions are not concurrent. The CCL use of great houses is the most pronounced per region, evidencing the highest prevalence among suitable buildings, and within a comparatively small area. In some ways, roomblock use in MSJR great houses is more like that of Chaco great houses in that only its two large satellite houses have such mortuary evidence. Yet, although Pueblo Bonito has the highest number of burials per room, Aztec and Salmon are distinctly different to it and other CCL great houses in terms of number of rooms used.

Significant to this study, when excluding Wallace, the MVR pattern is one of scant use of great house roomblocks for primary burial deposits. This is evidenced by the infrequent use of suitable buildings, the number of rooms utilised, the small number of individuals overall, and the small proportion of individuals per building or per room. How Ida Jean fits into this pattern is unknown, but from that evidence which is available, there is no observable pattern of multiple rooms with multiple individuals in either Pueblo II or Pueblo III times.

Dissimilarities among component variables are not as obvious in the domicile evidence, largely because roomblock primary burial deposits are rare in MVR and MSJR sites, other than 5MT3 and Morris 41. This result is most well-established in the MVR assessments. Just 8 of the 71 (11%) suitable Pueblo II domiciles and 19 of the 94 (20%) suitable Pueblo III domiciles have one or more primary burials in room MCT. Of the 12 Pueblo III sites with such deposits, nine entail a single farmstead, of which seven roomblocks have only one or two individuals.

That roomblock MCT are dispersed across the SJR landscape also indicates that the use of a surface room location is not associated with one specific group. Also worth noting is that this evaluation demonstrates that smaller, sub-regional geographic units have communities with mortuary programs that are distinct from those of settlements nearby. Examples include the more intense use of domicile roomblocks at 5MT3 compared to other Yellow Jacket sites, and Morris 41 versus the settlements less than 15 km distant at Barker Arroyo.

7.4 Conclusions: Comparison to Wallace Ruin

Against this backdrop of diachronic change and highly variable patterns in mortuary location choices, the Pueblo II mortuary program at Wallace is somewhat unusual but not unique. It involves a greater number of rooms and individuals compared to the evidence observed in MVR great houses associated with a roomblock primary burial. On the other hand, the Wallace ratio of individuals per room is similar to the MVR pattern for great houses and domiciles. It is also akin to the low-intensity pattern occurring in most of the SJR great houses with a primary burial (Aztec, Salmon, Kin Kletso and Pueblo del Arroyo) during that timeframe. In marked contrast, the Pueblo II use of the rooms in Old Bonito is anomalous, where a few North and West Cluster rooms contain a high number of primary burials. The occurrence of burials within the Wallace midden is also consistent with MVR Pueblo II mortuary trends in terms of great houses and domiciles.

In all respects, the Pueblo III use of the Wallace roomblock is exceptional relative to all other MVR great houses, except perhaps for the other members of the Lakeview Group. The mortuary evidence from Ida Jean suggests some parallels to Wallace, but the actual scale of use will remain unknown owing to the razing of its roomblock. On the other hand, in the opinion of this researcher, the likelihood is that it would be common "local knowledge" if a substantial number of burials were removed by the perpetrator given his connection to Haynie Ruin. The differences involving the Pueblo III use of the Wallace roomblock, by all tests and variable combinations, are statistically meaningful. There is almost no possibility that the evidence observed represents variation due to chance. The importance of this finding cannot be understated considering that the individuals deposited within its walls after AD 1180 were residents of a community or communities some 10 km or more from Wallace. This means that in terms of this mortuary location variable, the buriers did not draw upon concepts or practices utilised at Wallace during former times or concurrent in MVR residential communities.

This focused evaluation of roomblock mortuary evidence demonstrates that Bruce Bradley's (1996; 2004) reference to numerous Pueblo III primary burials at Wallace, Salmon and Aztec West is accurate. On the other hand, in total, less than 25 percent (4/17) of the comparative great houses have at least one primary burial in a roomblock. The exclusion of Chaco Canyon great houses is reasonable considering the apparent sparsity of the local population by AD 1180. In such case, just one third of the assessed great houses have a roomblock mortuary context. Either way, such comparatively low frequencies do not suggest that a pan-regional movement was robust, even if present. However, additional lines of evidence put further doubt on the occurrence of a widespread socio-religion movement manifested through mortuary practices.

When Bradley proposed his Chaco Revitalisation hypothesis in 1996, the conventional wisdom was that both Salmon and Aztec West were unoccupied by AD 1150, or contained only small populations, prior to their "re-use" in the late 12th century. More recent research indicates that this may not have been the case. According to Reed (2008a), migrants from Chaco Canyon commenced construction of the Salmon great house c. AD 1090 as a Chacoan colony, albeit with the assistance of the local "San Juan" population. He also concludes that Salmon is unique among Chaco great houses in that it primarily functioned as a residential building for a large population. It appears that, initially, both Chacoan migrants and locals inhabited the great house. However, during the AD 1120s the Chacoan population departed, possibly after experiencing the destructive power of the San Juan River during extreme flood conditions. Reed suggests that some of these individuals may have relocated several kilometres north to Aztec Ruins where they founded Aztec Ruin East, a second large great house adjacent to Aztec West. Meanwhile, at Salmon, members of the indigenous "San Juan" population continued to occupy the great house, subdividing the large Chaco-style rooms and inserting small kivas into numerous chambers and the large central plaza.

Architectural attributes and material culture evidence indicate that during Pueblo II times, Aztec West functioned similarly to Chaco Canyon great houses, with a small residential component overseeing ritual/economic needs. Brown and colleagues (2008:232) infer a "continuous, albeit punctuated" occupation until the late 1200s based on the number of rooms containing deep deposits of Pueblo III refuse and evidence of structure remodelling. Photographic evidence leaves no doubt that Pueblo III, Mesa Verde Black-on-white pottery occurs in many of the mortuary deposits containing ceramics, versus the rare occurrences of Mancos Black-on-white of the late Pueblo II Period.

Archaeologists have not specifically addressed whether the extensive use of these great houses for mortuary deposits dates to the early years of these postulated post-Chacoan occupations, which would be prior to the introduction of Mesa Verde Black-on-white pottery. At the time of Morris's publication on Aztec Ruin West (1934) McElmo Black-on-white, a style with similar attributes to Mesa Verde B/w but which overlaps Pueblo II and Pueblo III times, had not been identified. Since then, no one has, apparently, re-evaluated associated grave goods, or sherds from associated fill (if collected) to confirm the identifications of Morris. At Salmon Ruin, the appraisal of associated ceramics is unaffected by this potential typological problem; however, ware styles are not reported for numerous primary burials. Whether this contextual information has been lost or simply not provided is unknown. The point here is that even if both great houses continued to be inhabited after their Chacoan occupations, this does not mean that mortuary use of their surface rooms is necessarily co-incident. Still, the potential that some burials were deposited prior to AD 1180, but especially those at Salmon, is not consistent with Bradley's hypothesis. In sum, great house roomblock mortuary occurrence evidence is insufficient to reject the Chacoan Revival Hypothesis outright in terms of prevalence or chronology. On the other hand, information in the next chapter regarding room floor mortuary contexts provides additional grounds for the falsification of this hypothesis. It will also establish another line of evidence regarding Chapter 13's consideration of Chacoan house society attributes in SJR great houses and domiciles.

CHAPTER 8

WALLACE RUIN VARIANT: DEPOSITION ON A SURFACE ROOM FLOOR

8.1 Introduction

In this chapter, attention shifts to the vertical distribution of primary burial deposits within a roomblock, or surface rooms. The large majority of Wallace Ruin's primary burial deposits are on a floor. Accordingly, the aim of this chapter is to establish the very anomalous nature of Wallace's floor-centric Pueblo III mortuary program (P3WR) compared to all other San Juan Region sites or analytical groups. This evaluation also confirms the close similarity between P3WR location choices and those adopted in Pueblo Bonito's North and West Clusters during Pueblo II times.

8.1.1 APPROACH

The comparative evidence pertains only to mortuary location choices by occurrence within the three defined surface room mortuary context types (MCT): *fill, floor,* and *subfloor*. As previously stated, owing to its status as a Pueblo II great house and then a Pueblo III mortuary-ritual facility used by MVR residents of other habitations, this investigation entails the retrospective analysis of primary evidence from great houses and domiciles during each of these periods. When possible, great house appraisals involve the re-assessment of mortuary contexts from published photographs. Pueblo Bonito burial location trends are particularly emphasised owing to its status as the principal Phenomenon great house. Publications involving domicile sites rarely include photographs of *in situ* burials in a room context. Mortuary allocations thus rely upon written descriptions and maps, when provided. The information from MVR domiciles is robust and can be construed as representative of this region's trends at the 90% confidence level. In contrast, the MSJR domicile evidence is simply descriptive of the options exercised at those sites. This chapter is comprised of three major sections. The first contains site-by-site descriptions of evidence from great houses with a room MCT, by major archaeological district, followed by a synopsis of intra-regional trends. These focused analyses include the rationales used for MCT allocations that differ from previous interpretations. The second follows this pattern with respect to pooled data from domiciles, with some reference to key sites. The third section involves an interpretive assessment of inter-regional trends relative to those observed in the West Arm/Annex of Wallace Ruin, including detailed presentations of statistical tests of significance. Fisher's Exact Test assays evaluate differences between two groups in terms of their overall array of mortuary location choices. A series of N-1 Two-Proportion Tests evaluate MCT v MCT proportions among these vertical proveniences. Finally, key findings are presented in the chapter's conclusions.

8.2 Comparative San Juan Region Great Houses

Six of the 16 (38%) comparative great houses have one of the 64 primary burials deposits on the floors of a total of 27 rooms. By definition, this mortuary context type includes use surfaces. Table 8.1 reports these occurrences by great house and period. Other PBD potentially in a floor context are described in the relevant sections.

Table 8.1: Occurrence of room floor mortuary contexts in comparative SJR great houses, by number of primary burials and rooms, per period.

Period	Great houses	Primary burials	Rooms
Pueblo II	Ida Jean P.	1	1
	P. Bonito		
	N. Cluster	14	1
	W. Cluster	22	4
	Other Bonito	1	1
Pueblo II-III	Aztec W.	2	2
	Salmon R.	1	1
	P. del Arroyo	2	2
Pueblo III	Ida Jean P.	1	1
	Pueblo A	2	2
	Aztec W.	15	9
	Salmon R.	3	3

8.2.1 MESA VERDE REGION

8.2.1.1 *Ida Jean Pueblo, Lakeview Group*

Apart from Wallace Ruin, Ida Jean Pueblo is the only great house besides Pueblo Bonito with a Pueblo II floor MCT. Brisbin and Brisbin (n.d., unpaginated) describe the location of Burial 3 of Room 7 as "nearly one inch off the floor in the silt layer" with no mention of a burial pit. Burial 3 is therefore allocated to a floor MCT since the deposit location is within the contact zone convention of less than 5 cm above a prepared floor. These key details differ from their descriptions of the mortuary circumstances of Burials 2 and 4 of that same room. In contrast, these two children are in scooped-out or shallow pits intruded into a pre-existing silt deposit of unspecified thickness. The most conservative approach would be to consider Burials 2 and 4 as floor-associated. However, both are allocated to a fill context since each is in a pit, and unlike Burial 3, the Brisbins do not refer to an underlying floor. The mortuary context types utilised per room are documented in the Ida Jean and Pueblo A plans compiled in Figure 8.1.

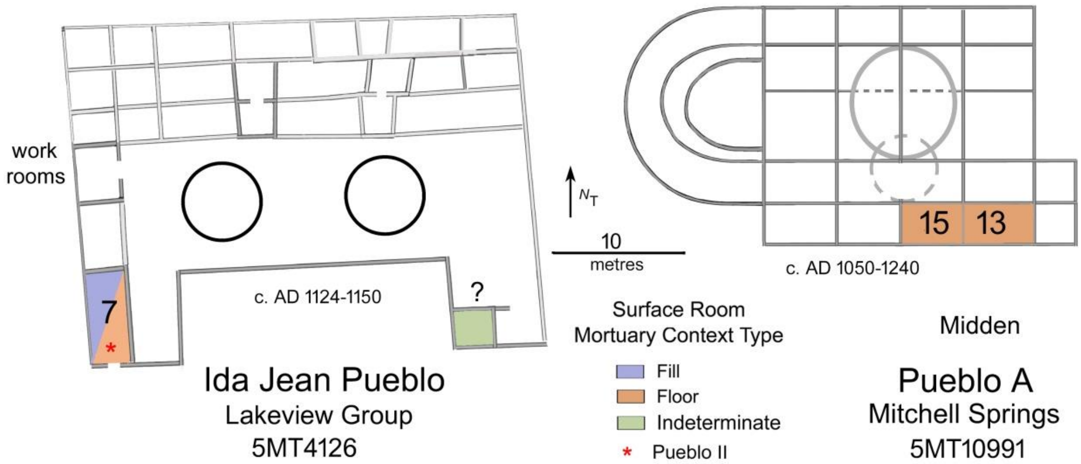


Fig. 8.1: Plans of Ida Jean Pueblo and Pueblo A, showing the occurrence of surface room mortuary contexts types per room.

During his research, Brisbin located the semi-flexed skeleton of an adult male with a Mesa Verde Black-on-white vessel on a surface room floor. This Pueblo III adult male is not included in his student paper (n.d.) since he was located after its submission. However, Brisbin recorded this mortuary context in a photograph, now archived at the Anasazi Heritage Center along with all Ida Jean Pueblo documents. The photograph label does not identify the specific room but it is evident that this individual is within a masonry room, on or just above floor level, and accompanied by a Mesa Verde B/w vessel. Although the information regarding the looted room in the southeast corner of the site is credible regarding the presence of at least one surface room mortuary context, the information is insufficient to establish a specific vertical MCT. Accordingly, thirteen percent of Ida Jean's excavated rooms have a floor MCT.

8.2.1.2 *Pueblo A, Mitchell Springs*

Two Pueblo A individuals are on or just above floor level in two rooms erected during Pueblo III times. The semi-flexed, poorly preserved skeleton of an individual of unknown sex and age in Room 13 is partially charred. The pattern of burned bone damage indicates that the skeleton was incompletely covered with dirt when a fire consumed this section of Pueblo A, possibly after its abandonment (Wheeler Smith, 1997a:94). The semi-flexed remains of a child are on the floor of the adjacent Room 15, a possible storage room. Otherwise, Pueblo A contexts with human remains are interpreted as occurring prior to the construction of an overlying room (Dove and Dove, 1997:29) or the probable re-depositions of remains disturbed by historic period looters (Ibid.:28).

8.2.1.3 *MVR Synopsis*

A surface room floor MCT is an extremely rare occurrence among the suitable MVR great houses assessed. In total, just four of the 16 individuals in any great house locus are in such contexts, and only one dates to Pueblo II times. Two more individuals are in fill and no subfloor depositions have been located; however, the specific MCT of the individual or individuals in IJP's looted room is unknown. Room floor use averages one individual per room. Between Ida Jean and Pueblo A, 14 percent of the excavated rooms contain a floor MCT. However, when evaluated in terms all six suitable great houses, just three or four of the estimated 100 excavated ground-storey room have a burial on a room floor.

8.2.2 MIDDLE SAN JUAN REGION

8.2.2.1 *Aztec West*

All mortuary context information regarding primary burial deposits comes from Morris's (1924) focused monograph on the mortuary evidence from Aztec West. Even though this is the largest skeletal population from any single NSJR sit including Pueblo Bonito, no significant re-appraisal of the mortuary evidence has been published to date; Erin Baxter's forthcoming doctoral study concerns associated material culture. Thus, the interpretive categories used by Morris and by subsequent researchers (Harrod, 2013; Lister and Lister, 1987) are based exclusively upon determinations made many decades before the development of *anthropologie de terrain*. Even so, Morris's descriptions and photographs are generally sufficient to re-appraise mortuary location choices for depositions within the great house in accordance with the criteria employed in this study. His determinations of primary burials versus re-deposited bones from disturbed contexts are also credible. Morris identifies subfloor mortuary contexts using empirical evidence of an intrusion into or through a pre-existing floor (or use-surface). This means that his approach and observations are consistent with those used to allocate MVR primary burials to this surface room vertical. On the other hand, whether all reported findings accurately represent depositional circumstances as opposed to subsequent site formation processes is open to question.

When discovered, all but a few of the Aztec West remains were overlain by cultural rubbish that was "allowed to literally swallow them" (Lister and Lister, 1987:53). There is no doubt that most of these are intrusive into room fill and that far fewer were deposited "in plain view upon the floor of the room" (Morris, 1924:148) with "no refuse of human origin surrounding or on top of it" (Ibid.:174). On the other hand, in a dozen or so cases the cultural fill overlying skeletal remains resting upon a floor or use-surface may constitute a post-mortuary accumulation. Morris (1924:163) notes that in the case of Burial 25, vessel fragments overlying the mortuary context seemingly involved the subsequent disposal of rubbish within the room. A similar circumstance may apply to Burial 24.3 of Room 109, whose lower limb configuration serves as the exemplar of a fully flexed postural arrangement in Figure 5.3 of this thesis. As documented in that illustration, and which can be viewed in Morris' (1924:159) Figure 8 photograph, lower limb skeletal displacements show that decomposition actually transpired in an open space, prior to the accumulation of the cultural fill removed by Morris. Despite these concerns, the MCT determinations made in this study are very similar to those of Morris since a retrospective analysis is impeded by the absence of published photographs for most of these mortuary contexts.

A minimum of 139 primary burials are in a surface room context, of which 126 are allocated to a specific MCT. In total, 17 are on a floor, 96 are in fill, 13 are in a subfloor pit, and 10 are in an indeterminate fill or floor MCT. Less than one-third (28%) of the 36 rooms with a primary burial contains a floor MCT. Figure 8.2 documents the pattern of MCT occurrence per room. Among these is Room 141, where, as reported to Morris by local resident Mr. Sherman Howe, several skeletons "on a shallow refuse deposit" were disturbed in 1882 by local pot hunters (Morris, 1924: 167-168). Even though these remains were “rifled” as the looters dug through this fill unit, Morris ascertained a MNI of 10 from the remains still in the room some decades hence. If this report is accurate, this description implies a use surface. For the most part, rooms with a floor deposition are widely dispersed. Rooms 29, 37 and 41 comprise the greatest concentration of rooms with a floor MCT. Rooms 37 and 41 are connected by a doorway (Morris, 1928:298) but there no direct connection to Room 29. The latter was abandoned and partially decayed before Burial 8 was deposited upon fallen wall stones and drift sand (Morris, 1924:147). The mortuary micro-environment in Room 37 was different, with two children deposited “in plain view” upon its prepared floor (Ibid., 148-151). In the adjacent Room 41, ashy fill was scraped back toward the walls and then five individuals and an abundance of grave goods were deposited “in the resulting depression” one to four inches above floor level (Ibid. 155). Since four inches (10 cm) exceeds the standard for a floor association, these might be in a fill MCT. However, they are assigned to a floor MCT since a credible argument can be made that this was the intended association and because the bodies were left uncovered. All rooms excavated by Morris and that have a specific MCT contain just one or two floor burials, except for Room 41. Both Rooms 77 and 94 have one infant in a floor MCT. Unfortunately, their temporal associations are unknown other than Pueblo II-III.

No Chacoan (Pueblo II) individual is on a room floor. The two burials that date to the initial use of the great house are in fill and subfloor MCT. The individual in Room 43 is in the only subfloor MCT not situated in the west side of the great house. Whether this is meaningful is unknown since Morris (1919; 1924; 1928) does not describe his excavation methods; consequently, it is possible that he did not fully investigate or test all subfloor regions. Possibly, one or more of the 13 individuals classified as Indeterminate Pueblo II/III dates to the Chacoan occupation. Most of these are in room fill, but one is in a subfloor pit and Rooms 77 and 94 contain one floor deposition each.

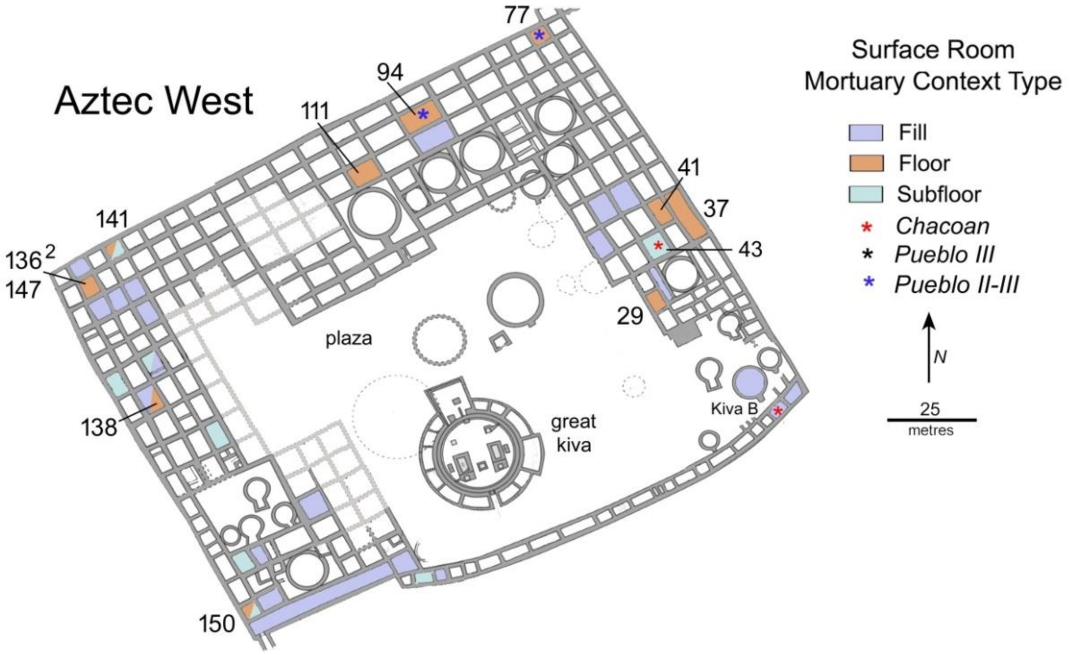


Fig. 8.2: Plan of Aztec West showing the occurrence of surface room mortuary context types per room and the widespread distribution of room floor MCT.

All three MCT categories were utilised during Pueblo III times, but most (77%; 85) of the 110 individuals in a specific MCT are within room fill. Conservatively, only 15 are in a floor MCT, which also by definition entails deposition in an open space. However, the inclusion of 10 burials in Room 141 that may be on a use surface and the re-allocation of eight skeletons on floors that are associated with cultural or natural fill, yields a 30% (33/110) rate of occurrence. Floor MCT representation is 38% when nine PII/III individuals are added to this tally. Even so, this maximum result is still just two-thirds of the adjusted (62%, 68/110) rate for room fill interments. A subfloor locus is the least common room MCT, with just 10 of the 110 determined MCT individuals in this provenience. The unadjusted (10/120), marginally lower prevalence of 8% is more accurate since indeterminate MCT allocations do not involve subfloor depositions.

8.2.2.2 *Salmon Ruin*

The variable quality of field documentation regarding archaeological and human remains evidence from Salmon (Espinosa, 2006:347) has, in several cases, detrimental effects on the confident identification of a primary burial deposit, let alone a specific room MCT. Even so, the total number of potential mortuary contexts identified here (78) is in line with the "71 inhumations" reported by Shipman (2006:327) versus the "more than 80" cited by Reed (2008a:57) in *Chaco's Northern Prodigies*. Unfortunately, the allocations to the room floor MCT are particularly insecure. Thus, to avoid undercounting floor contexts this tally includes all floor-associated human remains regardless of skeletal representation or provenience uncertainty. Accordingly, this group includes Burial 80 of Room 124W, a Chacoan or San Juan (Late Pueblo II-Late Pueblo III) child represented by just two contiguous teeth. Rather than a primary burial deposited within this room, these remains more likely represent the unintentional relocation of skeletal elements when the San Juan period kiva was inserted into this chamber. Another possibility not considered by Reed or Espinosa for any skeletal disturbances is that animal burrowing may account for the occurrence of teeth in this room.

Of the 66 primary burials in a surface room MCT, only four (6%), if that, are on a room floor. The locations of these individuals are documented in the Figure 8.3 Salmon plan, along with the distribution of all other MCT types per room. In contrast, 37 primary burials are in room fill, 24 are in a subfloor locus, and one is in a fill or subfloor context. None unequivocally dates to Pueblo II times, though Burial 80 could be from that timespan. Three individuals are confidently dated to the Pueblo III Period, but their allocations to a floor MCT are tenuous at best. Burial 3 of Room 11W, represented only by a premolar and several unidentified bone fragments, would not qualify as a primary burial in the more restrictive scheme used in MVR assessments. Burial 23 is included in this group even though a room fill MCT is probably more appropriate. According to Espinosa (2006:340-41), the four San Juan period individuals in Room 43W were deposited in mat-lined pits inserted into room fill (not described), and that Burial 23 "was placed on the Secondary [San Juan period] occupation floor, parallel to the east wall of the room, in an irregular, mat-lined pit that rested on top of cedar shakes." In this case, allocation to a floor MCT allows for the intent to associate the mortuary locus of this young adult female with a room floor. Finally, Burial 28 consists of the highly fragmented, charred and disordered bones of a child who "may have fallen to floor level with the collapse of the upper-storey roof and floor of Room 58W (Espinosa, 2006:342).

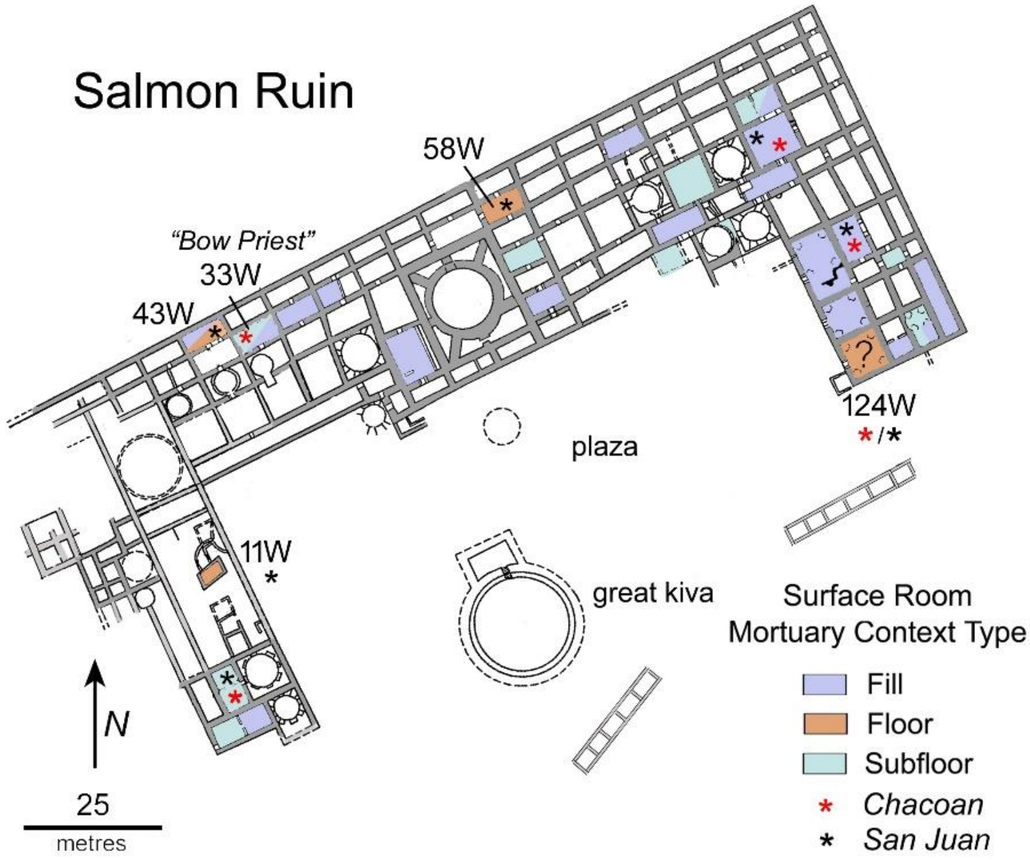


Fig. 8.3: Plan of Salmon Ruin showing the occurrence of surface room mortuary context types per room and the widespread distribution of room floor MCT.

No room contains more than one individual in a floor MCT, and there is no room cluster with such loci. Instead, the four rooms are widely dispersed. At most, four (12%) of the 34 utilised ground-storey rooms have a primary burial on a floor, whereas about one-third (35%,12) of these rooms have a subfloor burial and slightly more than half (55%, 21) have a fill MCT. In other words, rooms containing a fill or subfloor locus are three to almost five times more common than a floor locus. What's more, this is based on the assumptions that the floor MCT allocations involve that location and that they represent a primary burial deposit. By the stringent standards employed in the MVR study, no Salmon Ruin primary burial deposit is associated with a room floor.

8.2.2.3 *MSJR Synopsis*

In total, 205 MSJR primary burials are in a surface room mortuary context, of which 190 can be allocated to a specific room MCT. As noted in the previous chapter, Chacoan/Pueblo II primary burials at both Aztec and Salmon are very rare (3%), with no more than seven even when including skeletal remains that would be otherwise excluded from consideration. Setting that issue aside, only one PII individual, with the least credible primary burial designation, is in a floor MCT. A subfloor location is more common (4) than a room fill (2) MCT.

Evidence regarding Pueblo III, or post-Chacoan occupation, mortuary trends in MSJR great houses is quite substantial, with 182 individuals in total, or 170 in terms of a specific room MCT allocation. Of the latter, just 18 (11%) are in a floor context, though perhaps as many as 28 when including the 10 individuals in Room 141 who may have been on a use surface. Rather, the large majority (71%, 122) are in room fill, whereas less than 20 percent (18%, 32) are in a subfloor MCT. Even without the Room 141 individuals, floor deposits are essentially three times more common at Aztec than Salmon, which is represented by just three individuals at most. On the other hand, fill and subfloor (61% v 34%) prevalence at Salmon is less disproportionate than this relationship at Aztec (77% v 10%).

Evaluation of MSJR floor MCT prevalence in terms of number of rooms utilised per MCT type yields comparable results. Out of the total 69 rooms with a burial in any of the three vertical proveniences, 15 (22%) have a room floor deposition. In contrast, 39 (57%) rooms are represented by a fill MCT and 19 (28%) have a subfloor burial. Significantly, relative to all excavated great house rooms, just 5% (15/310) have an individual on a surface room floor. This proportion is equivalent to the subfloor prevalence (6%, 19/310), especially in view of the Salmon floor allocation uncertainties. In contrast, rooms containing a fill MCT (13%, 39/310) are almost three times as common.

To summarise, a room fill location was much preferred overall though especially at Aztec West. Room floor MCT are uncommon at both great houses, and when present frequently involve an informal use surface rather than a prepared floor. Possibly, floor depositions are undercounted since, from that information which is available, it is not possible to segregate individuals placed on a floor in an open space from those that were subsequently covered with cultural refuse. Of significance, neither the Pueblo II "Bow Priest" in Salmon's Room 33 (Irwin-Williams, 2008:282) nor the Pueblo III "Warrior" in Aztec's Room 178 (Morris, 1924:193-195) are on a room floor. Rather, both individuals, widely interpreted as holding an unusual status of some sort, are in subfloor pits. Webster (2008:187) raises the possibility that subsequent depositions in Room 33 and nearby chambers represent a specific familial or social group, but no such case has been made for Aztec Ruin.

Owing to their comparative potential to Wallace Ruin's HR 11 (see Section 12.7.1), brief descriptions of these two unusual mortuary contexts are merited; that of a Pueblo Bonito "warrior" is described in Section 8.2.3.1f. No images of the MSJR individuals are available for reproduction in this thesis; however, the field photograph for the Aztec "Warrior" can be viewed in Morris's (1924: Fig.18) monograph, which is available through the American Museum of Natural History's Digital Repository. The Salmon "Bow Priest" was accompanied by a bow, unusual arrows, and prayer feather holders, among other items. Unfortunately, Irwin-Williams (2008:282) offers no explanation regarding her interpretation of this individual as a probable Bow Priest; presumably, it is based upon ethno-historic accounts of recognised Bow Priests, who hold important positions of authority in Pueblo communities. In ethno-historic accounts, they function both as protectors and enforcers of social and religious order throughout the Pueblo world (Ortiz, 1979), and thus carry a bow as a staff of office during public ceremonials. Based on the number and type of objects found with Burial 83 of Aztec Ruin, Morris (1924, Fig. 18) posits that he was a high-status warrior. Among the numerous items found with him, the most noteworthy consist of a large (36 in x 31 in), oval coiled basketry shield with attached wooden handle and two axes "intended for use as weapons rather than as tools" (Ibid.:194). Morris, on the other hand, does not consider whether these objects may have represented official regalia.

8.2.3 CHACO CANYON LOCALITY

8.2.3.1 ***Pueblo Bonito***

Owing to the centrality of Pueblo Bonito in Chaco Phenomenon interpretations, the mortuary circumstances of the individuals located in the North and West Clusters are given focused attention on a room by room basis. Unfortunately, photographic evidence from this site is scant. There are no field photographs of North Cluster mortuary contexts, so this treatment relies upon the findings of Marden (2011). However, the West Cluster assessment involves interrogation of *in situ* photographs in addition to Judd's (1954) descriptions. Bioarchaeologist Ann Palkovich's (1984) study of the demography and paleopathology of West Cluster human remains makes no use of mortuary evidence other than their association with this architectural unit. She (Ibid., 104-105) reports only that rooms were "purposely converted into mortuary facilities; bodies were laid on the hardpacked floor, and then dirt was brought in to cover them. Some intrusions upon earlier interments by later ones are evidenced by the numerous disturbed skeletons noted at the time of excavation, although the extent of the disturbance could also suggest looting." Based on the presence of articulated limbs and the occasional torso Judd (1954:335) infers a prehistoric disturbance before decomposition was complete, probably by looters searching for turquoise. In her tally of individuals by age class Palkovich (1984: Table 3) counts 95 individuals in the Western rooms. This count far exceeds the 68 individuals identified by Judd (1954); those in the Chaco Research Archive (www.chacoarchive.org/cra/) and in this study, or the 73 remains tallied by Akins (1986:Tab. B.1). Regardless of the number of individuals present, mortuary information is associated only with the remains described by Judd (1954); these remains, with some adjustments, are listed in the CRA inventory.

Akin's (1986:119-124) summaries of mortuary evidence by West Cluster room include scant information, and no analysis, pertaining to vertical provenience. Her Table 5.13 mortuary location categories are limited to Room, Subfloor, Midden or Other, which means that it is necessary to segregate individuals in a room Floor versus Fill MCT. Her synopsis of Judd's descriptions is that "undisturbed burials were usually laid out on a surface and then covered with soil or debris, rather than actual interments" (Ibid., 125). The appraisal herein thus relies upon photographs provided in Judd (1954), with supplemental details obtained from the Chaco Research Archive and to a lesser extent, Akins (1986). The CRA does not consistently use the numbers assigned by Judd and used by Akins. Since this evaluation makes use of Judd's photographs, in which captions identify primary burials by his designations, his labels serve as the primary reference. For clarity's sake, both labels are included in Appendix C and all measurements herein are those reported by Judd. Akins' comparative analysis of mortuary associations makes use of data from just 17 of the minimum 68 West Cluster primary burials; these comprise five associated with the initial, Pueblo II (Red Mesa) occupation of Old Bonito and 12 individuals with Gallup pottery c. AD 1050-1150. Contra to Judd (1954), neither Akins nor this researcher infers that Phenomenon period depositions were necessarily inhabitants of Old Bonito spaces, though the current consensus is that they were probably inhabitants of the great house.

This appraisal includes an extended discussion of the mortuary context of Burials 13 and 14 of Room 33, owing to the widespread view that these two held an enhanced status, whether as Pueblo Bonito leaders, Chaco Phenomenon "paramounts" or house society forebears. Contra Marden and the consensus view, this section includes the primary rationales for this researcher's allocation of both to surface room floor mortuary contexts rather than subfloor designations.

a) North Cluster, Room 33

In terms of the discovered, archaeological context all 14 primary burial deposits in Room 33 are within or overlain by sand fill. In a lecture for the American Museum of Natural History in 1899, Pepper (n.d.:66-67) describes the room's contents thusly: "The room was six feet square and contained four feet of sand—in this scant deposit, fourteen bodies had been buried—not in the deposit, really, as they were part of it, for removing the remains with their wrappings would have materially reduced the thickness of the mass." Pepper provides no additional information regarding fill attributes in his 1909 or 1920 publications, field notes (1896a) or unpublished journal entries (1896b). Of note, in the latter Pepper (1896b: R2_007) writes that upon first entering the room with Wetherill and finding the tips of wooden objects "we could not determine what they were as I did not care to do any digging until I had time to do it carefully." Pepper (1920:117) specifically describes the excavations in Room 28, immediately prior to his work in Room 33, as one "requiring the most watchful care." Thus, the impression given in these statements and other such reflections is one of cautious excavation methods. Accordingly, a reasonable inference is that neither Pepper nor Wetherill noticed major variations in fill colouration or texture, though they did in Room 32 (Pepper, 1896a).

Six adult males and six adult females are located above warped planks that Morris interprets as a wood floor. These planks, which post-date the construction of Room 33, were laid directly upon sand fill, just an inch or two above adult male Burial 13 and 32 or so inches (75 cm) above the original "levelled floor of yellow sand" (Pepper, 1909:223) upon which Burial 14 is situated. The heavily disturbed "above planks" skeletons are in sandy fill, within a vertical space of around two feet (~60 cm) deep, as measured from the uppermost point of Burial 2's cranium to the estimated vertical location of the wood floor. Though Pepper's description indicates that none rest directly upon planks, measurements provided in his 1909 monograph suggest that two or three were within or close to the 5 cm (2 inch) standard for a "floor association." Unfortunately, establishing, or refuting, a vertical association between these remains and the wood flooring is problematic owing to the post-depositional disturbances of the skeletal remains and the warping of the boards. Those few skeletons in a somewhat ordered state are in extended positions. Calibrated radiocarbon dates reported by Plog and Heitman (2010:Fig. 4) for eight "above floor" individuals provide evidence of intermittent deposition events occurring from the late 9th century (1), late 9th or 10th century (1) and the 10th, 11th and 12th centuries (6). The two skeletons below the flooring are essentially undisturbed. Radiocarbon results date both to the late 9th century (Plog and Heitman, 2010: 19623), so shortly after the founding of Old Bonito, the domicile/ritual building eventually incorporated within the enlarged great house.

By the criteria employed herein, all 14 individuals are allocated to a room floor MCT. Marden (2011:273) identifies adherent insect puparia and damage by carnivores for the 12 "above floor" burials as evidence for deposit in an open environment. She (Ibid.) also concludes "there is no evidence that any digging was involved in their entombment. Rather, it seems that each successive body was laid in the room and that the sand found around them was blown in naturally. This is supported by Pepper's description of blown sand in adjoining Room 32."

The 24 inches (70 cm) of sand fill between #s 13 and 14 may have accumulated naturally, as it did for Burials 1-12, or it could represent an intentional post-mortuary deposit to cover Burial 14 or, alternatively, one intended to prepare a mortuary locus for Burial 13. At any rate, as these two skeletons have adherent insect puparia, Marden (2011:202) concludes that Burials 13 or 14 were not deliberately covered at deposition and, also, that "some time" passed before they were overlain with fill. *Calliphoridae* (blow fly) are the likely insects in this region. Under climatic conditions in which temperatures range from 10 to 25 degrees Celsius during a 24 hour interval, puparia development takes 4 to 14 days (Greenberg, 2002: Tab.2.1), though longer at lower temperatures. Considering the deposition environment and the chilly overnight lows during summer in Chaco's arid climate, an estimated two to three-week timespan is reasonable.

Apart from the large vertical space between Burials 13 and 14, Pepper provides no evidence that their post-deposition microenvironments differed; nor do they vary from those above the planks, apart from post-deposition disturbances. Accordingly, a key point is that regardless of the “sandwiched” partition, all 14 had similar mortuary and initial, at least, post-mortuary microenvironments.

Thus, even though Marden does not apply Duday’s (2006) nomenclature, her description is consistent with a primary burial deposit on a use surface and within an open space. This interpretation is contra to Pepper’s (1909:221) interpretation and the consensus view adopted by Plog and Heitman (2010:19623) that the mortuary context of both individuals involved a deliberate covering with sand. Seemingly, since it has not been a point of discussion, the common viewpoint is that this effort involved filling the entire floor space to an even level and the laying of the plank floor shortly thereafter. As it stands, there is no means to establish from Pepper’s (1909:248) statement “these were adjusted so as to *cover completely the floor space presented by the sand placed over the first burials*” (C. Bradley’s emphasis) whether he infers a fill overlaying just these two mortuary contexts or one extending across the room.

Yet, Marden (2011:274-276; 2015) maintains the prevailing interpretation that Burials 13 and 14 are subfloor burials owing to their location under the plank floor. In the widely received words of Akins (1986:116), “this portion of the room had definitely been set aside for the interments.” Though Marden refutes Akin’s assumption of a filled space, she construes the area beneath the wood floor as a crypt, and that planks were lifted on occasion to deposit assorted items (but see Appendix E for a discussion of the problems with this interpretation). That both individuals were undoubtedly below the plank partition at discovery does not necessarily equate to a subfloor mortuary context. Rather, the position taken here is that even though scholars consistently refer to “paramount” #14 as a subfloor burial, his allocation to a room floor MCT is rather the most secure of the Room 33 depositions. A significant factor in the varying interpretations involves the absence of an accepted structure life history. Thus, a proposed sequence is offered in Table 8.2. This scenario is similar to that offered by Plog and Heitman (2010), though this history uses Marden’s later findings.

Over the years, the undefined application of the term *subfloor* has been a source of confusion regarding interpretations of the mortuary contexts of Burials 13 and 14. Initial descriptions of vertical provenience relative to the wood floor pertain to locational rather than associational attributes. Pepper uses neither *subfloor* nor *subfloor burial*. Instead, he describes the boards as "separating" Burials 1-12 from those "under the floor" (1909:221). Yet, he also recognises the occurrence of intrusive "below the floor" pits, which he terms "pockets." Pepper (1920:194) describes a pit in Room 38 as "at a depth of a foot below floor level, a circular cavity had been dug in the floor and the skeleton of a macaw was found. The hole had been carefully formed, filled with adobe, and the surface finished so that there were no evidences of its position."

Judd's (1954:338) use of *subfloor* is also locational when he describes Burials 13 and 14 as "Beneath the floor" and as "these two subfloor burials." Since Judd does not mention wood flooring or a horizontal partition of any sort in Room 33 in his major Pueblo Bonito publications (1954; 1964), the commonplace inference would be that these individuals are located under the original earthen floor. Neither archaeologist even implies that the planks were necessarily related to the mortuary contexts of individuals above or below this partition.

Since then, bioarchaeologists and archaeologists have adopted the usage of *subfloor* in terms of meaningful association in respect to Burials 13 and 14, even while applying the term in the sense of location for other remains in Chaco Canyon. Unfortunately, since they do not define their usage, their meaning can be ambiguous. In most cases, Akins and Schelberg (1984) and Akins (1986; 2001) seemingly adopt the locational perspective when categorising Chaco Canyon mortuary contexts by vertical provenience.

However, Akins and Schelberg (1984: 92) are the first Chaco scholars to hold that the plank flooring is a constructed component of the mortuary contexts of the two underlying "paramount" burials. Yet, they do not provide arguments to support this shift to an associational perspective. They advise that the plank flooring, the preparation of the sandy and ash floor deposits for the #14 locus, and Judd's (1954) supposition that soil may have been brought into West Cluster rooms to cover burials as indicators of greater energy expenditure. Yet, why this would apply to the depositions below rather than those just above, or possibly on, is not explained. Thus, even though their interpretation that the Burial 14 mortuary locus entails both an earthen floor and a plank floor, they choose to include him in *room subfloor* tallies in various tables, though they could have just as well allocated him to a room floor category.

The absence of detailed plan or profile maps also undoubtedly contributes to interpretative differences. Pepper did not create a profile map for Room 33. His field plans record locational information for crania only, apart from Burials 1 and 5, with no reference to the position of the roof support posts located near each corner of the room. Neither Akins nor Marden offer profile or plan maps in their various publications, nor have any other archaeologists, with one exception. The 3D profile map of Plog and Heitman (2010: Fig 3) captures Pepper's vertical and horizontal measurements for locations of crania, mandibles and selected objects. Pepper measured vertical distance between the bottom of a ceiling beam and an object's uppermost point; horizontal location is determined by the distance between an object and a wall.

Plog and Heitman (Ibid.:19622) advise that depth from ceiling beam may have an inconsistency error up to 15 cm since Pepper made use of different ceiling beams of unrecorded diameter; moreover, he seems not to have adjusted for the "slight bulge" in the ceiling. However, their 3D map pinpoint locations do not consider cranial dimensions, nor does it include the vertical position of the plank floor since Plog and Heitman are leery (for good reason) of the accuracy of Pepper's single vertical measurement. Their use of the metric system complicates correlation with Pepper's statements, and conversion of Pepper's imperial measurements to the metric system is a source of two errors in their publication. The first is that the east-west dimension (1.6 m/5'3") in their Figure 3 map is inaccurate by some 20-30 cm. By Pepper's measurements (1909:246; 1920:163) room width is either 1.83 m (6'0") by north wall length or 1.91 m (6'3") by south wall length. Fortunately, only a few horizontal measurements are inaccurate since Pepper took most measurements from the east wall. Plog and Heitman's (2010: 19622) description of fill unit depth between #s 13 and 14 as "0.7 cm" is clearly a transcription error since their map accurately locates #13 at 0.7 m above #14.

Table 8.2: Proposed chronological sequence of major events regarding Pueblo Bonito's Room 33; those involving human remains are italicised.

c. AD	Event
~850	Construction of a one-storey room in the central section of "Old Bonito" (Stage 1B: Lekson, 1984); SW corner of four interconnecting rooms (32, 53 and 56). Walls: single-coursed, masonry; plastered; height of ~8 feet (2.44 m). Roofing: 13 beams, varying diameters, running N-S; overlain by bark and adobe. Doorway: raised-sill, built into east wall (R.32/33); sill height not recorded. Floor: earthen, smoothed yellow sand
	Ceiling support posts/vertical posts added in all four corners; prior to signficant accumulations of sand fill and before laying of plank flooring.
mid-late AD 800s	*Deposit of Burial 14 and grave goods on or just above the earthen floor; uppermost cranium is 7'9" below a ceiling beam. Supine, extended body is oriented roughly N-S in central area of the room. Corpse deposited upon a layer of wood-ashes that overlies either the sand floor or a thin deposit of yellow sandy fill; not covered with sediments at deposition. Plog and Heitman (2010) calib. AMS dates: median, AD 817, 95.4%, AD 690-940; pooled dates: median, AD 873, 95.4%, AD 690-873.*
	Development of roughly 2 feet (60 cm) of sand fill; either accumulations of wind-blown sand or an intentional fill: post-mortuary (at least several days) if intentional.
	Deposit of the enwrapped corpse of Burial 13 and numerous grave goods upon a sand fill use surface; uppermost cranium is 5'5" below a ceiling beam; lateral, extended body is diagonal to Burial 14 and angles NE-SW. Corpse not covered with sediments at deposition. Plog and Heitman (2010) calib.AMS dates: median AD 821, 95.4% AD 690-944; pooled dates: median AD 781, 95.4% AD 691-877.
	Accumulation of sand fill; either gradual accumulation of wind-blown sand or an intentional, cultural fill: post-mortuary (at least several days) if intentional.
	Deposition of Burial 12 on a sandy fill use surface; uppermost cranium is 4'10" below ceiling beam (~3'0"-3'6" above earthen floor); in central-east area of the room, just south of two support posts; body extends to west. Corpse not covered with fill. (FEM B) AMS cal. AD 676-894 (95.4%), median ~AD 800. At or just above the level of the planks but the horizontal position relative to planks is unverified.
	Accumulation of wind-blown sand over corpse.
	Deposition of Burial 6, by south wall on a sandy fill use surface; 4'8" below ceiling beam (~3'2"-3'6" above the earthen floor); above the level of the planks but the horizontal position relative to planks is unverified. (FEM A) AMS cal. AD 776-989 (95.4%), median ~AD 900.
	Accumulation of wind-blown sand over corpse.
AD1040+	Crafted planks laid directly upon sand fill, one to three inches above the uppermost point of Burial 13's cranium. Plank attributes are consistent with Late Bonito (Classic/McElmo) woodworking technology. Covers E-W floorspace but N-S extent not described. Not integrated with wall: no wall ledges or wood framework. Slight accumulation of sandy fill.
	Periodic depositions of Burials 1-5, 7-11, grave goods and ceremonial items over two or so centuries as wind-blown fill accumulates. Burials 10 and 11 are just above the plank floor; Burial 11 may be beyond the described area of the flooring. *Uppermost skeleton (Burial 2) is roughly 4 feet above the earthen floor and ~1'3" above the plank flooring.*
	Post-deposit disturbance of skeletised remains; commingling of bones from individuals above and below plank floor, but unknown if mixing occurred prior to excavation or during/after recovery (Marden, 2011:644).

The profile and plan views of Room 33 compiled in Figure 8.4 are offered as approximations of the evidence gleaned from Pepper's various accounts. The diacritical marks in the Room 33 profile indicate the points of measurement on each cranium as denoted in Pepper's sketch maps (1896a) or as described in text (1909). To approximate the distance from the measured uppermost point on the cranium to the underlying deposition surface, each is represented by a standard 6-inch "cranial depth" regardless of orientation. Arrows indicate the probable axial direction of the skeleton; line lengths for Burials 13 and 14 are approximately to scale. That of #13 is based on estimated stature for an extended skeleton. The extent of flexure #14's lower limbs is unknown. However, the cranium's location represents the measurement from the north wall, and feet are against the south wall, as described.

The Room 33 plan compiles skeletal and architectural descriptions scattered through Morris's publications (1896a-c; 1920). However, the room footprint is based on Judd's (1954) more accurate map rather than Pepper's (1920), though even this drawing is adjusted slightly to accommodate wall length measurements. Post diameters, which Pepper did not record, are an estimated six inches, though the "largest" one in the NW corner is eight inches. As noted on this map, the elevation of the plank floor location is uncertain. With these difficulties in mind, it is best to construe these maps as plausible visual aids.

Plog and Heitman (2010:19622) describe the floor as "laid across the entire room." However, while this is an understandable interpretation of Pepper's text, another possibility is that the planks covered just the central, intra-post area of the room. Pepper does not specifically address floor-space coverage in the areas north and south of the support posts situated roughly 20-30 cm from each corner of the room in any text or field note. For example, in this 1896 field notes (CRA, 1896a) Pepper writes "The boards were in a very good condition and had no doubt been made especially for the room, as they were about the width of the room, or at least had been when new." Potentially, boards were fabricated to accommodate these posts and the irregular spaces between them and the north and south walls. However, a reasonable inference is that such extremely skilled woodworking, which would have required the production of various custom-fitted board shapes, would have elicited further comments from Pepper, who by 1920, was aware of the diverse shapes in wood altar components.

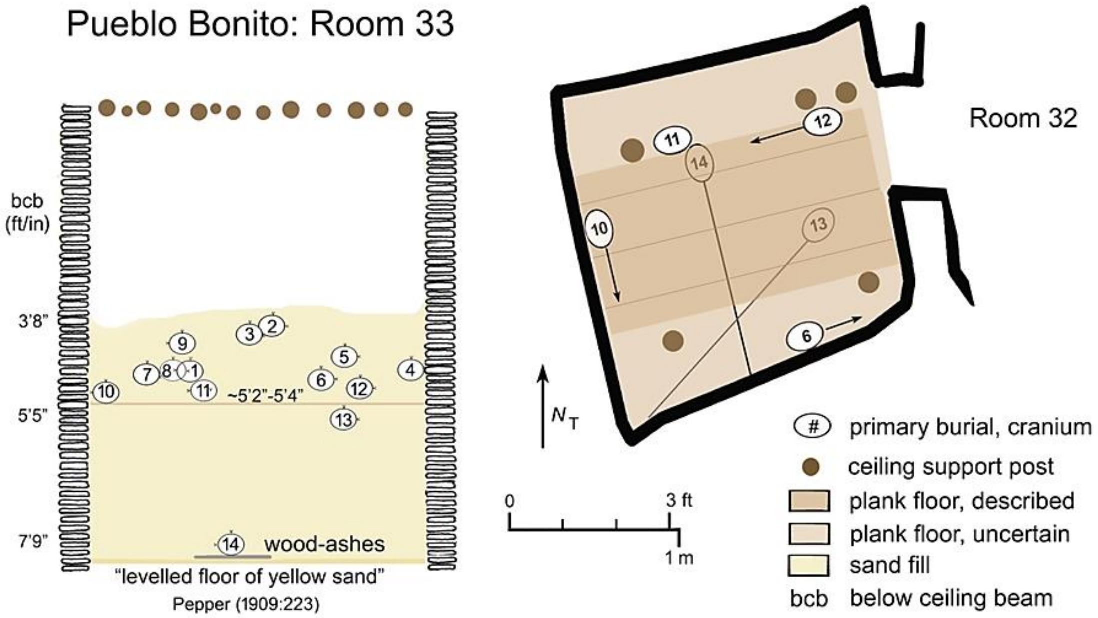


Fig. 8.4: Interpretive profile and plan views of Room 33 of Pueblo Bonito, showing the locations of crania, primary burial deposits and significant architectural elements.

The extended skeleton of Burial 13 is encompassed by sandy fill, diagonal to and 28 inches above the adult male Burial 14. Pepper (1909:223) describes the skeleton of Burial 14 as "resting upon a layer of wood-ashes which had been spread upon the levelled floor of yellow sand." The skeleton of this adult male is supine, with arms parallel to the torso, lower limbs slightly flexed at the knees, and feet close together against the south wall. Pepper (1920:248) reprises this description in his conclusions, stating that "the only preparations for burial that could be noted were those in connection with skeletons Nos. 13 and 14. In this instance the floor had been covered with a layer of yellow sand on which a layer of wood-ashes had been placed." From these two descriptions, it is uncertain whether the floor is made of sand or if it was covered with a thin layer of yellow sand as part of the mortuary ritual. Such unfinished sand floors are common in Chaco great house ground-storey rooms (Lekson, 1984:29). Regardless of the actual circumstances, both descriptions make evident that the deposition microenvironment involves a prepared floor surface, as opposed to an intrusive pit cut into the sterile sandy-silt strata underlying Pueblo Bonito. Pepper's account also indicates that both skeletons and their associated grave goods are essentially undisturbed.

This researcher disputes the interpretation that the wood planks are associated with the mortuary contexts of Burials 13 and 14 and, consequently, their identification as subfloor burials. A full presentation of the complexities pertaining to the interpretation of the plank flooring is beyond the scope of this chapter. Therefore, this section addresses only evidence pertaining to wood plank technology and wood plank distribution within the room. In this discussion, the planks are evaluated in terms of Pepper's identification of them as floor components; however, an alternative interpretation, in which these planks are instead retired altar components, is offered in Chapter 12.

Unfortunately, Pepper seems not to have collected planks for samples, nor are there any photographs or detailed drawings. However, in the words of Pepper (1909:248), "The floor that separated the burials is worthy of notice. It was made of boards that had been shaped and smoothed until of uniform thickness…" Though Pepper's 1920 publication on his work at Pueblo Bonito includes information on Room 33 architectural components that he previously described in his 1909 monograph, he does not mention a wood floor, boards, or planks from this chamber. This omission is difficult to interpret. It may be that Pepper believed that he had covered this evidence sufficiently in the earlier report. Another possibility is that he had since changed his mind about what these boards represented. In contrast, Pepper (1920:70-71) makes several observations in this monograph regarding the crafted pine floor boards in Room 14a (now Room 303c): "sides and ends have been carefully ground with sandstone rasps… The construction of floors of this kind is rather uncommon in Pueblo Bonito, due to the fact that the manufacture of boards of this nature was a tedious task…These are found in various parts of the ruin and will be described as the work progresses." Unfortunately, this last sentence is the final comment made regarding wood planks in his monograph on Pueblo Bonito. Even so, the complete absence of remarks regarding Room 33 flooring suggests that he no longer considered those boards as particularly significant by 1920.

According to Judd (1964:82), "hand-smoothed 'planks' were a Late Bonitian specialty…[that] may have appeared as floor boards more frequently than we know, but they were also used as lintels or sills for Late Bonitian doors, ventilators, and wall repositories. The Old Bonitians, as far as I may judge, were not workers in wood and the dressed pine and cedar boards we observed in their empty dwellings were probably acquired from the Late Bonitians through trade or otherwise." Given this insight, it is puzzling that, in his foremost works on Pueblo Bonito, Judd (1954; 1964) did not address the apparent incongruity between an Old Bonitian structure Room 33 that, from Pepper's description, contained a wood floor made of planks evidencing attributes of Late Bonitian woodworking technology. In the Fig 8.4 plan above, the boards are drawn as if all extend across the near six-foot E-W expanse of the room. Based on the measurements provided in Table 8.3, the fabrication of multiple boards nearing six feet in length, averaging 12 inches in width and a fairly uniform ¾ to 1 inch thickness would be a considerable technological feat, even when considering the expertise shown in other worked wood discovered in Chaco Canyon great houses (Vivian, 1978). A plausible scenario is that the "adjusting of planks" involved boards of more typical dimensions, so perhaps three to four feet in length, placed end on end to form a floor, just as they would have been in Pepper's domestic experience and in the present day. It is also surprising that archaeologists have not considered this technological disparity in subsequent treatises that evaluate the Room 33 burials in terms of energy expenditure and differential status (see especially Akins and Schelberg, 1984; Lekson, 2007).

The locations of the worked planks built into Pueblo Bonito floors or sills and kiva wainscoting are plotted in Figure 8.5 below, whereas Table 8.3 also includes timescales and dimensions. Other than Room 33, no Old Bonito room contains crafted, hand-hewn plank floors. The single plank in Old Bonito Room 323 is associated with doorway remodelling. Room 303c (Pepper's Room 14a) and Room 300B, the rooms nearest to Room 33, are Phase 2 structures erected around AD 1040-1050. Room 33's planks were placed directly upon sand fill in an action unrelated to room construction or remodelling. Assuming that Judd is correct regarding the timespan of crafted board technology, Room 33's floor planks were fabricated between c. AD 1040-1150, and thus more than a century after the late 9th - early 10th century deposits of Burials 13 and 14.

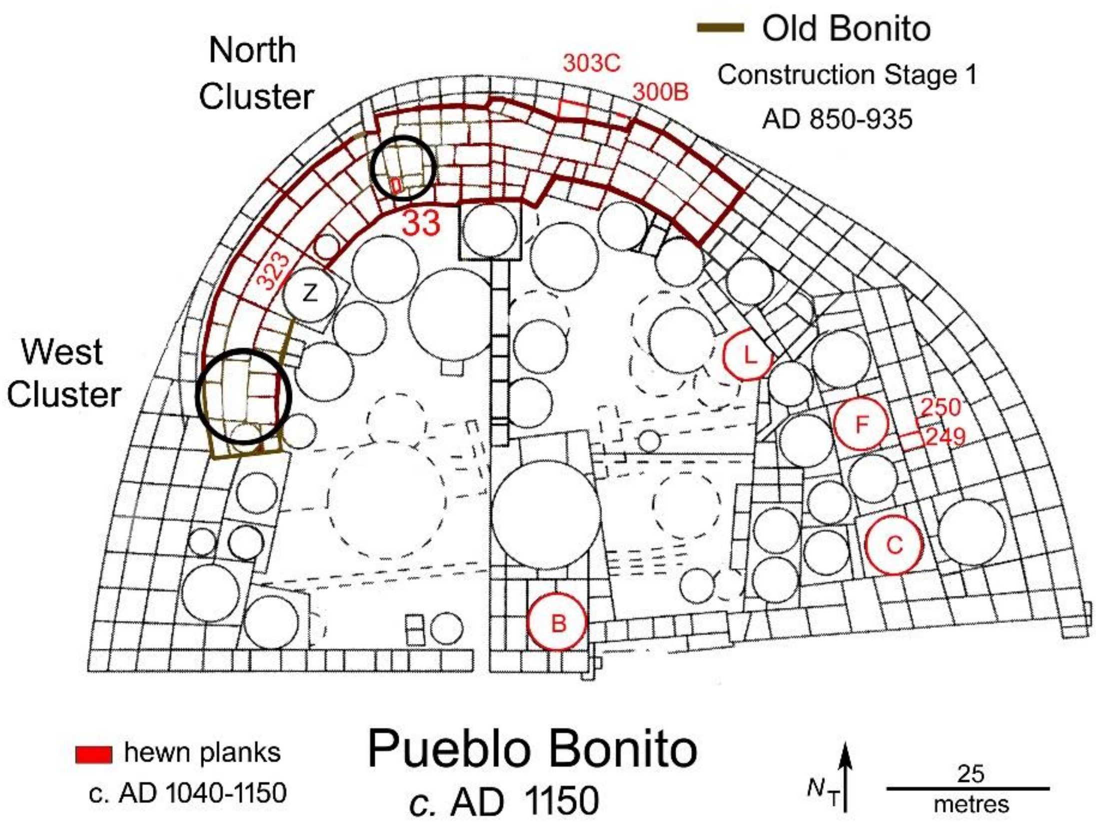


Fig. 8.5: Locations of hand-hewn planks in Pueblo Bonito rooms and kivas.

Table 8.3: Refined, hand-hewn planks of Pueblo Bonito (Judd,1964).

Room/ Kiva	Structure (AD)[1]	Length	Width	Thickness	Number
R. 33	860-935	< 6'	ave.12"	0.75-1.00"	> 1
R. 249	1050-1070	26"	5 "		1
R. 250	1100-1150	lintel			1
R. 300B	1040-1050	lintel			1
R. 303C	1040-1050		7"	0.75"	7
K. B	1050-1070	< 34"			> 1
K. C	1050-1070	ave. 20"			> 1
K. F	1050-1070				> 1
K. L	1100-1150				7
K. Z/R.323	1100-1150	31.5"	5"	1.75"	

[1] Stein et al., 2003; B=2nd storey; C=3rd storey (1st & 2nd, British)

A potential interpretive conundrum pertains to the radiocarbon dates for Burial 6 (cal. AD 776-989) and Burial 12 (cal. AD 676-894), as both predate c. AD 1040. This presents a difficulty in terms of superposition; since both individuals are above the planks it may mean that the floor was indeed fabricated around the time of the deposit of Burial 13. In contrast, the locations of Burial 10 (cal. AD 1023-1185) and Burial 11 (AD 985-1181) just above this partition are not problematic since both have median dates at about AD 1100 (Plog and Heitman, 2010: Fig 4). From the description provided by Morris (1909:214), most of the skeleton of #6 was scattered, with only the cranium and a few cervical vertebrae constituting an articulated unit located along the south wall. Morris (Ibid.:221) describes the remains of #12, just interior to the two posts in the northeast corner of Room 33, only as extending to the west with many bones in place. Marden (2011:648) identifies adherent organic materials indicative of burial wrappings for this individual and infers that joints were still connected by dried tissues some decades after deposit. Thus, a factor worth considering is that both skeletons, or specific anatomic units, may have simply been moved aside to accommodate the laying of planks; alternatively, it would be a simple matter to slide planks under enwrapped, desiccated remains. Marden's (2011:368-372) determination that some of the disordered elements and anatomic units of individuals above the planks represents intentional movement and re-ordering actions involving post-deposit mortuary rituals provides support for this possibility. On the other hand, various points of information generated by Pepper provide an archaeological basis to infer that that this apparent superposition does not cast doubt on this alternative interpretation. Further consideration of this factor is addressed in Appendix E.

b) North Cluster, Room 56

Room 56 contains two empty subfloor pits and eight highly disordered skeletons in strata disturbed by W. Moorehead in 1897 during a "collecting expedition" (Marden, 2011: 93). In addition, Marden (Ibid.:818) concludes that a cradleboard and the scattered bones of infant H5628 in Room 53 originated in Room 56. Marden's (2011:205) re-association efforts regarding other individuals substantiate Pepper's supposition that all bones and materials from Room 53 represent Moorehead's discards from Room 56. All but two individuals are in indeterminate surface room mortuary contexts.

Two individuals are in a subfloor MCT, though there could be as many as four. Only adult male N3075 is securely associated with a specific pit (south). The remnant of a masonry wall from an earlier structure separates the "north" and “south” pits, extending from floor level to a point below both pits (Pepper, 1920: 217). Each subfloor pit is thus within the confines of this earlier structure. Pepper assumes that the upper margins of these pits are at the level of the Room 56 floor, although another possibility is that one or both could predate its construction. The reality is that Moorehead obliterated potential evidence for an intrusive floor feature and he produced no field notes or descriptions (Marden, 2011:730). He also would have removed any ceramic chronological markers that could demonstrate that the deposition(s) necessarily post-date the construction of Room 56. Although he collected numerous objects for his benefactors, any secure provenience associations with Room 56 are now irretrievable. As there is no evidence otherwise, and consistent with previous researchers, both pits are deemed as representing subfloor MCT with a minimum of one individual per pit.

The presence of adherent insect puparia (Marden, 2011:Tab. 10) indicates that initial decomposition, at least, of three corpses occurred in an open environment. Whether their mortuary microenvironments entailed a floor of some manner or a subfloor pit having the open microenvironment of a casket is unknown, though the latter seems to be the case for N3075. Moorehead removed the undisturbed skeleton of this adult male, enwrapped in a feather blanket, and his accompaniments from the south pit. Several bones have adherent insect puparia (Marden, 2011:205; Tab.10). Pepper (1920:217) suggests that the south pit was covered with boards or matting based on the presence of such fragments in the adjacent Room 53. He does not explain his association of these boards with this particular pit, but this makes sense because its sides and base were lined with boards and sticks, whereas the north pit is unlined. Such preparation is consistent with a subfloor interment involving a void space where insect puparia could develop.

c) West Cluster, Room 320

This small storage room contains the remains of 10, or perhaps 21 (Palkovich, 1984) individuals located within about a foot of vertical space. The first mortuary use involved the deposit of the supine and extended corpses of two adult females on a single rush mat placed upon the flagstone floor. At some point, the bodies of six more adult females, an adolescent of unknown sex and a child were deposited on or just above the floor; whether these entail sequential depositions or a single event is unknown. The two photographs comprising Plate 91 of Judd's 1954 publication documents human remains located in the NW and NE quadrants of Room 320. In the upper photo, the headless skeleton of adult female Burial 2 is in a prone, extended position, resting upon a mat that directly overlies flagstones. The retention of the costo-vertebral connections and most anatomic relationships suggests that her deposition position is essentially unchanged. Alternatively, Akins (1986:119) surmises that her body may have been moved when still largely intact, possibly during an event in which the remaining skeletons were left in considerable disarray. Plate 91 also documents an articulated adult torso next to #2 that is on or just above floor level. In addition, of the four crania viewable in the lower photograph of Plate 91, three apparently rest upon flagstones. The fourth cranium may sit upon a thin layer of floor fill, as does a second articulated torso.

Judd (1954:386) reports, "At time of interment, 10 bodies had been lightly covered with earthy debris including potsherds and pieces of adobe mortar and flooring." This preliminary interrogation of the photographic evidence raises the possibility that this stratum did not develop until after the disturbance of mortuary contexts. Evidence for this interpretation is provided by the shared elevation of several displaced intact adult crania and large anatomic units, possibly including the articulated infra-cranial remains of Burial 2, which is on or just above floor level. In addition, photographs of the NW and NE quadrant of Room 320 (Plate 91) show several complete vessels but no sherds. These items may have been removed prior to photographing the skeletal evidence, which was obviously excavated with great care so that individual elements were documented in their discovered positions. Even so, one would expect to observe an occasional sherd under a displaced bone or skeletal region. Consistent with Judd's description of a "light covering," skeletal and material culture evidence indicate that corpses were overlain with no more than a meagre amount of fill at deposition, if that. The earliest mortuary context has no ceramic grave goods; however, the presence of Red Mesa and Chaco Black-on-white vessels indicates that depositions occurred during Old Bonitian (Pueblo II) and Late Bonitian (Phenomenon) periods.

d) West Cluster, Room 326

This large habitation room contains the mortuary contexts of 11 (Judd, 1954) to 18 (Palkovich, 1984) individuals deposited upon the prepared floor or on the upper contact zone of two or three fill units either created by humans or which developed naturally over time. Most of the skeletons are undisturbed, however Akins (1986:121) reports four to 11 disturbed or incomplete skeletons. The earliest mortuary context comprises the remains of adult female Burial 14 resting upon a woven mat laid directly upon the floor. Owing to her unusual, for Pueblo Bonito, semi-flexed positioning Judd suggests she died in her sleep when resting comfortably on her side and that her death prompted the abandonment of the room for habitation purposes. Judd infers that buriers covered her body with materials nearby, including dried mortar scraped off the room's walls. Judd's (Ibid., 327) description of the next mortuary context (Burial 12) in chronological sequence is somewhat at odds with this description in that he refers to "reconstruction waste carried in for burial of No. 14 [that] was hurriedly levelled until only 6 to 8 inches thick." However, the field photograph (Plate 93, upper) shows that Burial 12's patellae have "dropped" out of anatomic position onto the floor, which could not occur if the body had been overlain with a substantial fill stratum at the time of death. Assuming that this photograph documents the anatomic displacement during decomposition rather than failure to maintain bone pedestalling during excavation, it seems that this stratum, however thick, represents the post-mortuary accumulation of natural fill associated with structure deterioration. Burial 12 was supposedly overlain with construction debris which Pepper (1954:328) describes as shallow, "obvious from the fact that three of the vessels at her head were immediately overlain by an empty burial mat" that probably held the articulated torso of adult female Burial 8. Burials 8 (partial), 9 and 10 are 10 to 12 inches above the floor; as mentioned previously, captions provided for Plates 94 and 95 indicate their deposit on a use surface or "second burial level." Unfortunately, the details in the photographs are too indistinct to evaluate potential bone displacements, so whether these and the remaining primary burials were deliberately covered with construction debris cannot be resolved at this time. On the other hand, the disturbance of Burial 8 prior to the completion of decomposition suggests that her corpse was overlain by no more than a thin layer of fill, if that, by the time of this event. According to Judd

(1954:329), “Above these five skeletons and generally throughout the room was some 18 inches of floor sweepings and trash…” Since Judd does not describe sherds, etc., as amongst the skeletal remains, it is uncertain whether this accumulation represents a mortuary or a post-mortuary context. Two of these remains (# unknown) were disturbed prior to the decomposition of all soft tissue connections. The movement of large anatomic units (torso) is consistent with deposition in an open space, or one involving scant coverage by fill. Akins (1986: 121) describes this unit as actually comprising two layers of refuse and one layer of natural fill; however, it is emphasised here that there are no grounds to infer that any mortuary context involves a deliberate intrusion into one of these layers.

At some point, a second set of five individuals were deposited, either as a group or in rapid succession upon the upper contact zone of the last fill layer. Two bodies (or possibly another unspecified individual) were disturbed significantly prior to the cessation of soft tissue decomposition; this again indicates that the absence of a thick layer of fill coverage at deposition. The determinations made for Room 320 are applicable to Room 326 with all individuals allocated to a floor MCT, albeit with more reservation. The probability is that the primary emphasis involved deposit on a floor or use surface, with subsequent intentional covering by sediments of less consideration to buriers, if present.

e) West Cluster, Room 329

Due to the highly-disordered state of most of the remains in Room 329, Judd’s (1954) tally of individuals is 24 whereas Palkovich (1984) counts 35. In contrast to Rooms 320 and 326, most of these are infants and children (Akins, 1986:122). Of those primary burials identified by Judd, only the skeletons of four children, and infant and an adolescent of undetermined sex are undisturbed. Burials 1 and 2 are in direct contact with the floor. Otherwise, four more intact skeletons and the extremely disordered remains of at least 18 individuals were distributed through about 14 inches of wind-blown sand mixed with meagre amounts of household trash. Judging from the photographic evidence in Plate 97, numerous bones are at the same elevation; the exact position relative to the floor is indeterminate though closer to the floor than the upper region of the fill. Even though it is likely that many more individuals were deposited on or just above the floor, these 22 individuals are allocated to the Indeterminate Surface Room category. However, there is no indication that mortuary contexts involved deposits of cultural fill other than apparently meagre "household sweepings."

f) West Cluster, Room 330

By Judd's (1954) reckoning, Room 330 served as a mortuary locus for 24 individuals though (Palkovich, 1984) counts as many as 32. Only the remains of three adult males and one child are undisturbed. From the evidence observable in Judd's Plate 99 (upper and lower), the presence of numerous articulated anatomic units indicates that disturbance occurred before soft tissue decomposition was complete. A roof hatchway provides the only entrance into Room 330, but Judd (1954:333) infers that this room was used for "esoteric purposes" rather than a storage room owing to the presence of a stone-lined firepit and floor-level ventilator through its east wall. He thus draws the conclusion that the two young adult males interred in "cramped quarters under the floor" may have been members of the "secret society" that used this space and the first burials within this chamber as well. The lower photograph of Plate 93 of Judd's report documents the supine, upright knees configuration of Burial 23; a Pueblo II/Red Mesa vessel is at the level of the head. The retention of anatomic connections, including both patellae, signals that his corpse was covered with fill at deposit. Judd provides no description of Burial 24, but information from the Chaco Research Archive, so possibly Accession records, records that Burial 24 was also semi-flexed but positioned on the right side.

The supine skeleton of Burial 10 (PBR330IB11) rests upon the floor in centre of the room and on a thin layer of sand. As can be seen in the field photograph displayed in Figure 8.6, his heels were together but knees flexed outwards, "so that the leg bones formed a diamond, and inside this a black on white bowl was found, as well as a triangle of 28 arrowheads, placed on the sand, and arranged to represent a large arrowhead" (Judd, 1954:333; Plate 98, lower). Judd goes on to describe this adult male as "a warrior in his prime" owing to his association with these projectile points and the cluster of reed-shafted arrows under his hips. Judd is silent as to the origin of this sand layer; however, it may well have been a planned component of the mortuary context to facilitate the careful arrangement of the projectile points. Burial 10's dropped mandible is consistent with decomposition in a void. This is in keeping with Judd's (Ibid.) observation that whether #10, a child interred within a floor-level adobe bin, or an old adult of unknown location was the "first to be interred above floor level. But we do know that first inhumation was scantily covered with occupational debris." The single stratum between floor and the collapsed ceiling is a 16-18" thick layer of sandy fill that contains a scatter of sherds and floor sweepings. Judd infers that 21 bodies were interred within this stratum; however, considering the extreme disturbance of these remains, their vertical proveniences are uncertain. Therefore, these are assigned to the Indeterminate Surface Room category. Conceivably, the child within the adobe bin could be allocated to a floor MCT since the body rested directly upon the room floor, which comprised this storage feature's base.

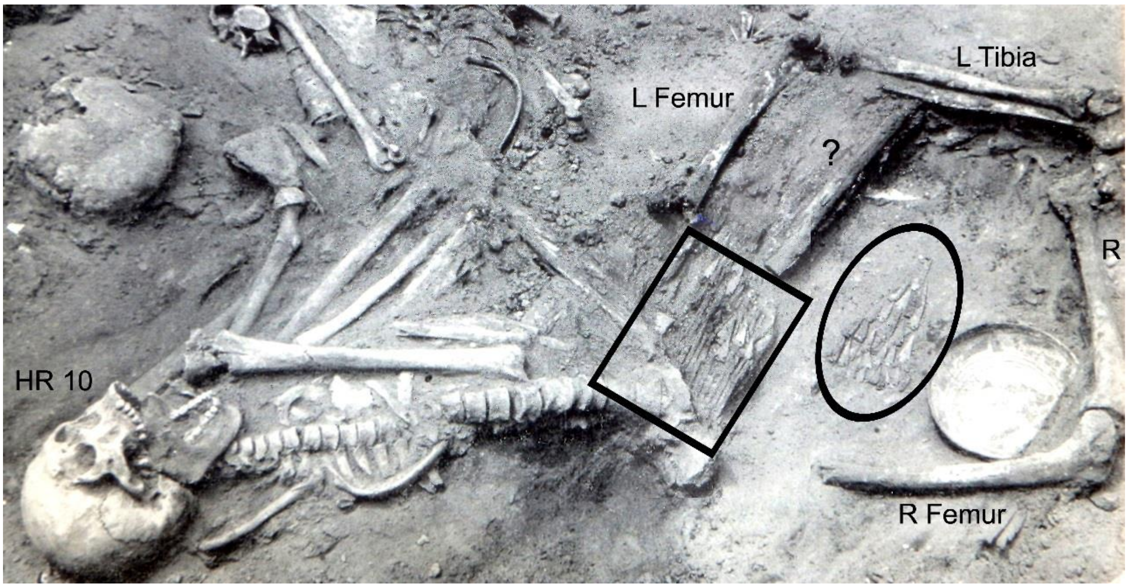


Fig. 8.6: Field photograph of Judd's Burial #10 and grave goods, amidst disturbed skeletal elements in Pueblo Bonito's Room 330 (*Judd, 1954: Pl. 98*, *public domain*). *Triangular arrangement of arrowheads (oval); reed-shafted arrows (square) rest upon a quiver remnant (Ibid.:254). The material and identity of the linear object medial to the left femur is not described.*

g) Other Pueblo Bonito (OPB)

Just six other Bonito surface rooms contain at least one clear-cut mortuary context, though no room has more than one individual. A young child in Room 287 is in fill, a foetus/neonate is on the floor of Room 309, another foetus/neonate and three infants are each in a subfloor MCT in Rooms 79, 90, 290 and 306 (Pepper, 1920; Judd, 1954; Marden, 2011). Only Room 306 is within Old Bonito. Whether this infant is from the earlier or later phases of occupation is unknown.

h) Pueblo Bonito evidence summary

All but one (93%) Pueblo Bonito primary burial is in a specific (46) or indeterminate (51) surface room MCT. Some 80% (37) of the individuals in a specific vertical provenience are in a floor MCT, though the majority are on a use surface rather than a prepared earthen or adobe floor. The high number of primary burials that cannot be allocated to a specific room vertical provenience, roughly half of those observed, means that the accuracy of these results is uncertain. Undoubtedly, the large majority are in floor or fill MCT. Yet, the chances are that interments within existing strata of natural, or especially cultural, fill are rare. Considering that just one individual is in a non-Cluster room fill context lends credence to the impression that all or most of the disturbed remains are associated with a floor or use surface.

Fourteen of 24 (58%) North Cluster primary burials are in a surface room floor MCT whereas only two or so are in a subfloor locus. Twenty-two of the 68 (32%) West Cluster primary burials are allocated to a room floor MCT with reasonable certainty. Since this MCT, as defined in this thesis, involves a floor/use surface and an open space, the only uncertainty is whether this second variable was in effect or if bodies were deliberately covered with sediment fill. Accordingly, this sum includes only those for which Judd's descriptions or photographs indicate minimal coverage at most. If the only consideration is deposition on a floor/use surface, then the number of such MCT allocations may be substantially higher. Regardless of the actual number, it is evident that a room floor MCT was the preferred mortuary location choice for West Cluster depositions.

No Room 33 deposition involved intrusion into room fill or, more definitely, overlaying with cultural refuse. Eight individuals in Room 56 cannot be allocated to a specific surface room vertical; possibly, one of these was in the larger of the two empty subfloor pits, but most were in a fill or floor context prior to disturbance by Moorehead. None Of the 68 West Cluster burials identified by Judd are in a context in which there is indisputable evidence of intrusion into an existing stratum of fill of any type, including the trash layers in Room 326. Moreover, even if thin overlying fill strata are directly associated with mortuary behaviours, the amount of material culture discard is notably scant.

Just two West Cluster individuals are in a subfloor context. As is typical for that period of archaeological research, Judd does not describe evidence for intrusions through the floor. However, the location of Burial 23's pit along the south wall indicates that it is associated with this room rather than being an extramural grave that was eventually covered by the construction of Old Bonito. That Red Mesa pottery is associated with both Burial 24 and "warrior" Burial 10, who is in a floor MCT, is in keeping with the Old Bonito occupation period.

The commingling of elements during extensive post-deposit disturbance(s) and in post-excavation curation, and the lack of opportunity to conjoin or re-associate bones, probably explains the significant differences in Western cluster population estimates. Which result is accurate is indeterminate at this point. As is the case for Wallace Ruin, Marden's (2011) retrospective analysis of Northern suite remains demonstrates the crucial need for the intra-suite re-association of skeletal elements for accurate population estimates as well as the segregation of post-depositional events from mortuary actions.

Finally, this re-interpretation of the Room 33 subfloor identifications comprises two crucial points. The first is that Burial 14's mortuary microenvironment involved the intentional construction of a deposit locus that included the spreading of wood ashes, and possibly yellow sand, upon or slightly above the original, earthen floor, and then, as determined by Marden, corpse decomposition in an open space. The second is that the planks are unrelated to the construction of the Burial 13 and 14 mortuary contexts; therefore, they are not the uppermost component of a crypt that formed a separate void space within a burial room. The parsimonious explanation is that this plank partition is related to one or more "above floor" depositions, which could thereby imply a change in room function or status associated with the expansion of the great house and the development of the Chaco Phenomenon.

8.2.3.2 *Pueblo del Arroyo*

The bodies of two individuals were deposited upon the floor of a Pueblo del Arroyo surface room. The body of an adolescent male in Room 13 was partly covered by windblown sand (Judd, 1959:18) whereas all doorways were sealed following the deposition of Burial PRR040IB01 in Room 40. The remaining eight primary burials were deposited within cultural fill. According to Judd (1959:172), "Unused rooms and kivas became dumps for household rubbish and in this a dozen or more burials were made…"

8.2.3.2 *CCL Synopsis*

Figure 8.7 documents the distribution of mortuary context types per room for the CCL great houses of Pueblo Bonito, Chetro Ketl, Kin Kletso, and Pueblo del Arroyo. This illustration draws attention to the distinct difference between the utilisation of room floors at Bonito compared to the other CCL great houses. It also identifies Room 93 of Chetro Ketl, which contains hand-hewn wood altar fragments. In terms of the three vertical intramural loci, of the 114 primary burial deposits, 41 (36%) are allocated to a room floor MCT, 12 (11%) are in room fill and nine (8%) are in a subfloor context. Unfortunately, a specific room MCT designation cannot be made for almost half (52; 46%) of the primary burials located; all are from Pueblo Bonito except for the one individual from Chetro Ketl. Akins (1986:B1:160) classifies two Kin Kletso infants in “shallow pits” as in a floor location, with no further description in text. Additional details are not available in the Chaco Research Archives online database. Since Akins uses *pit* rather than *depression*, both individuals are in a subfloor MCT by the criteria applied herein.

Although evaluation by number of primary burials is problematic, another indicator of scale differences between Bonito and the assessed CCL great houses pertains to the number of floor MCT per room. With good confidence, 35 Bonito individuals from five rooms are in a floor MCT, for a ratio of seven individuals per room. In contrast, the Pueblo del Arroyo ratio is 2:2, or one person per room. The difference between these two proportions is statistically meaningful (p=0.032). Moreover, the potential is that the actual difference is even more distinct since there are reasonable grounds to infer that the depositional context of many others involved a room floor.

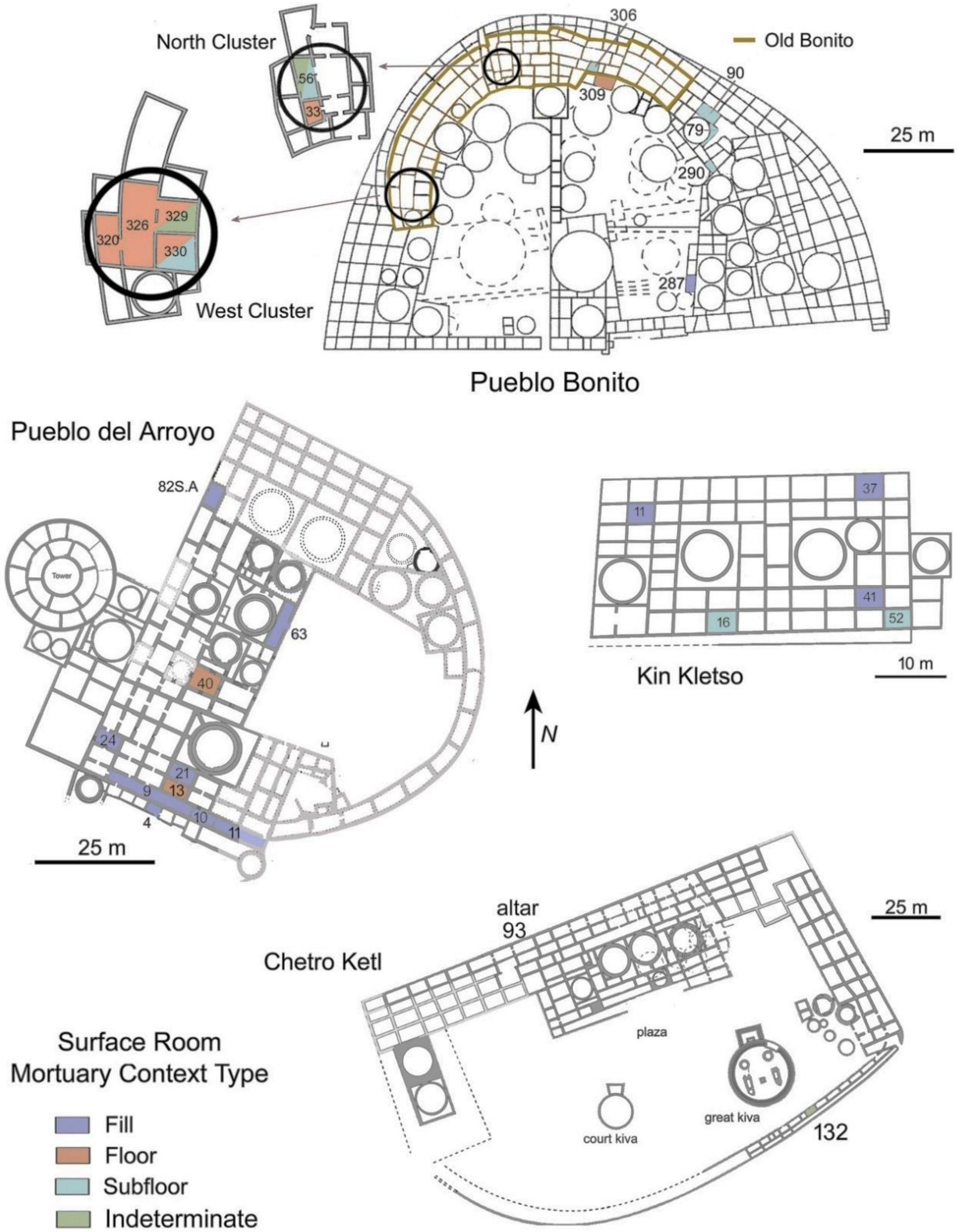


Fig.8.7: Compiled plans showing the distribution of surface room mortuary contexts in Chaco Canyon great house rooms.

8.3 San Juan Region Domiciles

8.3.1 MESA VERDE REGION

8.3.1.1 *Pueblo II*

Significant to this study, a surface room floor MCT is extremely rare in Pueblo II domiciles of the Mesa Verde region. The room allocations per domicile are provided in Table 8.4, which also shows that no domicile is represented by more than one category. No 2 km or 12 km Lakeview Locality domicile has a room MCT of any type. As is observable in Fig. 8.8 the only site that may have a floor deposition is many kilometres south of Wallace in the southeast corner of the MVR study unit. Yet, the individual from Site 5MT2436 may be neither floor-associated nor even a primary burial. From Reed's (1984:408) account, it does not seem that any articulated units are present. Several bones are on the floor of a surface room, but these elements may be intruded from the overlying room fill that contains more bones from this person. There are no grave goods. The ends of several bones are scorched, but Reed advises that the evidence is insufficient to determine if this damage was accidental or intentional. That these bones are not in their original deposition location is suggested by the absence of evidence that the floor or fill were exposed to fire. Thus, it is questionable whether this is a floor deposition, but it is deemed as such mainly because the description provided is too sketchy to refute Reed's determination.

Table 8.4: Occurrence of Mesa Verde region Pueblo II primary burials by surface room mortuary context type, by domicile.

	Fill	Floor	Subfloor
5MT, Site 3			1
5MT11555.H	1		
5MT2148			3
5MT2544			1
5MT8651			1
5MT2836		1	
5MV1088	2		
5MV34.2			1
Total	3	1	7

Evaluation of the prevalence of all 10 MCT types identified during the comprehensive analysis of MVR mortuary location choices further establishes the rarity of room floor location. For comparative purposes, the comprehensive presentation of Pueblo II and Pueblo III MCT findings are juxtaposed in Figure 11.9 at the end of this chapter section. In this evaluation, the domicile count involves multiple location selections at some residences, not the total number of suitable domiciles with at least one primary burial deposit.

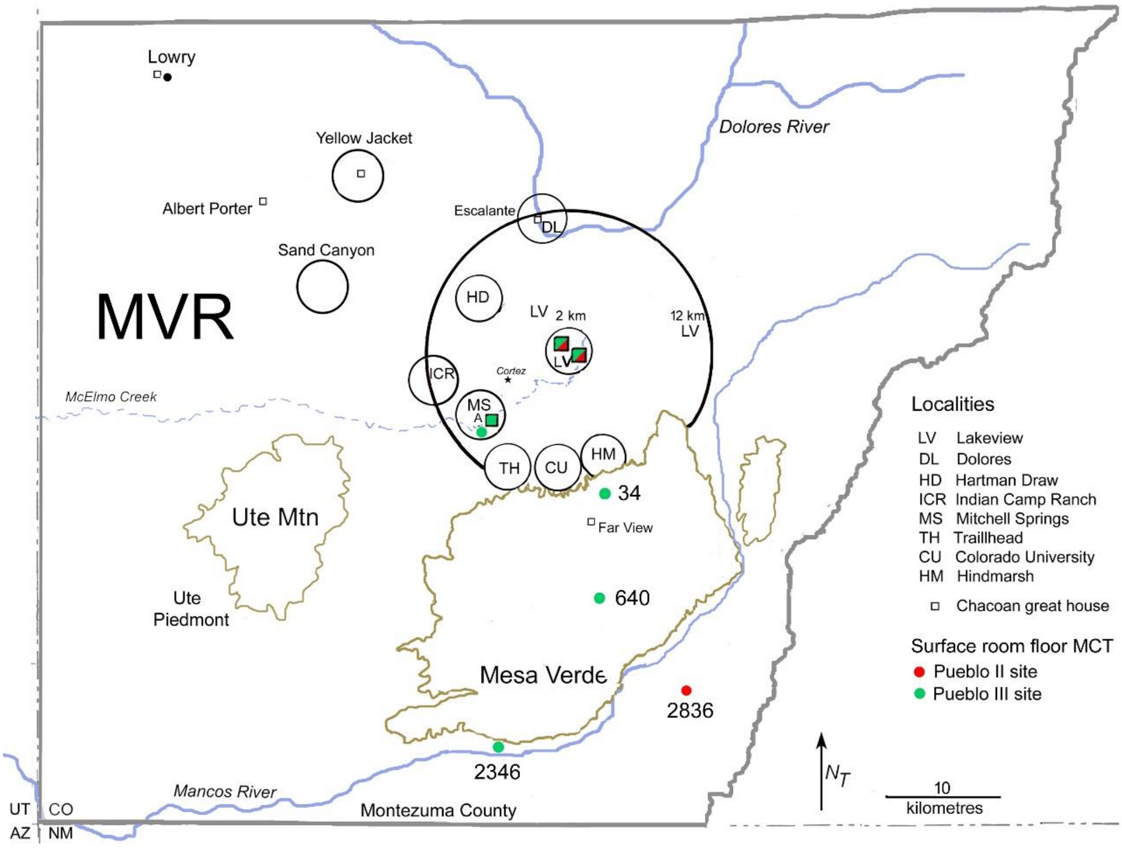


Fig 8.8: Locations of MVR sites with a Pueblo II or Pueblo III surface room floor mortuary context.

That said, just 2% (1) of these 47 domiciles, or 1% of the 71 assessed suitable domiciles, have a floor MCT. It is thus very marginally more prevalent than a subsurface structure subfloor MCT, which was not utilised in Pueblo II times. Whether calculated by domiciles or primary burials, floor prevalence is less than one percent. Though room fill and subfloor loci are more prevalent than a floor MCT, all three are among the least common mortuary location options selected. That the subfloor depositions outnumber floor burials is particularly noteworthy. Billman (1998) explicitly mentions that entire room subfloor areas were excavated to sterile in the investigations of the Ute Piedmont sites at Cowboy Wash, but the extent of subfloor excavations, if any, is not described for several MVR sites (Prudden, 1914; 1918; Martin, 1929; Luebben, 1982; Nordby, 1974). Thus, whilst it is evident that fill and floor contexts at those sites are completely investigated, it may be that some subfloor depositions have been overlooked. If so, the numerical discrepancy between the room floor versus subfloor contexts may be more pronounced.

8.3.1.2 *Pueblo III*

A room floor was rarely used for a mortuary location during Pueblo III times as well. Of the eight allocations identified in Table 8.5 only those concerning one individual from 5MT2346 and two from 5MV34 are secure. No 2 km Lakeview Locality domicile has a room MCT of any type, and the only one within 12 km is associated with a domicile situated in the Mitchell Springs locality. At 5MT10991, the fully flexed skeleton of an older adult female is in a Sector 11 test trench (distant to Pueblo A) that reveals the floor of a Pueblo II building. Several flat rocks are under her head, and she is accompanied by a corrugated jar and black-on-white bowl of a non-specified ceramic style. Unfortunately, this mortuary context is not otherwise described, so it is not evident if this is a surface room or a subterranean structure. Conservatively, she is assigned to a surface room floor context. The remains of two individuals are on the floor of Room 1 of Site 5MT2346, habitation situated south of Mesa Verde in Mancos Canyon and several km west of 5MT2836. This site is renowned in the archaeological literature (see White, 1992) due to compelling evidence of intense post-mortem processing of the corpses of multiple individuals at the end of its Pueblo II occupation. However, there is no evidence of peri-mortem trauma in the remains of the five primary burials associated with the Pueblo III residence. Burial 1 is *in situ* and accompanied by numerous vessels, but the bones of Burial 9 are highly disturbed and distributed across the floor surface. Burial 1 is allocated to a room floor mortuary context but the information from Burial 9 is inadequate for such a determination.

Remarkably, even though Site 5MT3 primary burials comprise almost half (42%, 22/53) of the PIII surface room mortuary contexts, none is in on a surface room floor. Three of its domiciles have a total of seven individuals in room fill, compared to four domiciles with 15 subfloor burials. All but 5MT3.5 has one or more individuals in both mortuary locations. The subfloor burials account for some two-thirds of the MVR burials in this provenience, whereas its fill depositions constitute one-third of the MVR individuals in this MCT.

In the view of Mobley-Tanaka (2005:51), it is reasonable to interpret rooms containing a substantial amount of rubbish as abandoned, and that furthermore, this use of abandoned rooms is specifically related to the availability of masonry rooms in the Pueblo III era as opposed to the less substantial *jacal* buildings of the Pueblo II Period. While this interpretation makes sense, it does not account for the absence of floor use. Ostensibly, the use of a floor negates the further use of that room for other purposes, whereas a subfloor burial does not. Yet, this does not factor in to Mobley-Tanaka's scenario, since these rooms were ostensibly abandoned regardless. All told, 5MT3's Pueblo III mortuary program involved the avoidance of floors and a definite preference for subfloor loci.

Table 8.5: Occurrence of Mesa Verde region Pueblo III primary burials by surface room mortuary context type, by domicile.

	Fill	Floor	Subfloor
5MT1.B	1		1
5MT10991		1	
5MT2346		1	
5MT3.5			3
5MT3.17	5		5
5MT3.65	1		2
5MT3.73	1		5
5MT765.1206	1		
5MT8651			1
5MT, Site 7	1		1
5MV1200.C	1		
5MV1200.F	2		
5MV1200.H	1		
5MV1200.J			1
5MV1228	5		
5MV1285.A	1		1
5MV34.1			3
5MV34.5	1	2	1
5MV640		4	
Total	21	8	24

At 5MV34, a multi-component site positioned near Mesa Verde's north rim, the skeletons of two individuals are on the floor of Room 36, a Pueblo III surface room associated with Kiva V (i.e., kiva unit 34.5). An older adult male accompanied by Mesa Verde B/w mugs is roughly in the centre of the room. A young adult male with two such mugs is in the southwest corner of the room. At first glance, O'Bryan's (1950: Fig.25:66) plan of 5MV34 burial locations gives the impression that there are a substantial number of primary burials within the surface rooms of this medium-sized, multiple-component residence. Potentially, such a distribution provides a second site that is reasonably comparable to Wallace Ruin mortuary patterns, in addition to Site 5MT3. Yet, once these depositions are sorted by temporal period and the bone clusters from disturbed depositions are eliminated from consideration, the Pueblo III surface room group involves just seven individuals in five rooms. The distribution of these rooms, and those of Site 5MT3, are documented in the Fig 8.8 plans for each site. Kiva unit 34.5 is the only Pueblo III domicile with a primary burial in all three surface room contexts. Thus, overall, 5MV34 mirrors the Pueblo III preference for a subfloor MCT in terms of room contexts.

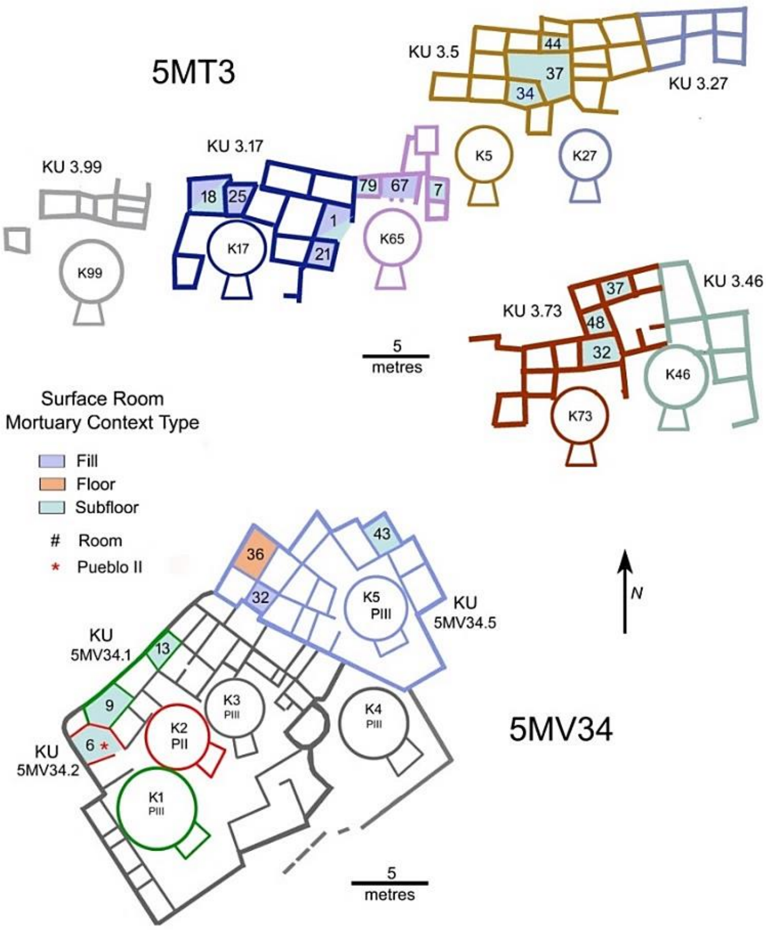


Fig.8.9: Distribution of surface room mortuary contexts at Sites 5MT3 and 5MV34, where one room only involves a floor mortuary context.

Much of Spruce Tree House (5MV640) had been despoiled and plundered for vessels and other artefacts prior to Fewkes' (1909) efforts in the early 1900s to excavate and stabilise the site in as an interpretive resource for the newly-established Mesa Verde National Park. During two decades of looting, an incalculable number of mortuary contexts were removed or disturbed. A rare exception to this early-days information void is provided in the first scholarly description of the site by the botanist Gustav Nordenskiöld (1979 [1893]:55), who records the discovery of the skeletons of three infants within Room 69, which he did not excavate entirely. Some 15 years later, Fewkes (1909) completed the excavation of this chamber and located the skeleton of a fourth individual, an adult of undetermined sex with unspecified grave goods. In his report, Fewkes refers to the infants located by Nordenskiöld, then goes on to say:

> Evidently the doorway of this room had been walled up and there are indications that the burials took place at intervals, the last occurring before the desertion of the village. The presence of burials in the floors of rooms in Spruce-tree House was to be expected, as the practice of thus disposing of the dead was known from other ruins of the Park; but it has not been pointed out that we have in this region good evidence of several successive interments in the same room.

Unfortunately, Fewkes provides neither evidence nor arguments for this interpretation, and it is by no means certain how to interpret "in the floors" as opposed to "on the floors." This is not a typographical error since he repeats this phrase in his report on Cliff Palace (1911). Possibly, it implies a succession of floors or use surfaces. On the other hand, this descriptor could refer to what are now termed subfloor burials, since this is the usage applied by Morris (1924) at Aztec Ruin. Conservatively, all four of the Room 9 burials are assigned a surface room floor context.

Thus, despite the increased utilisation of room floors, this MCT is still very rare in terms of Pueblo III prevalence by burials (3%, 8/253) and the total number of assessed domiciles (4%, 4/71). Compared to the occurrences of primary burials in the other nine MCT, only subsurface structure floor and substructure subfloor loci are less common. By domicile representation, only a subsurface subfloor location is rarer. However, only one percent of primary burials are in a floor MCT when prevalence is determined from evidence that is certain. At most, four domiciles have a floor MCT, with an average of two individuals per domicile. Spruce Tree House (5MV640) has four, but there is a strong possibility that one or more is rather in a subfloor pit. Relative to all 50 domiciles with a primary burial in any location, eight percent have a floor burial versus four percent of the 96 suitable domiciles assessed. Even when evaluated in terms of the maximum number of potential floor MCT, a fill or subfloor location is some three times more common whether counted by burials or domiciles.

8.3.1.3 *Diachronic Change*

A comprehensive comparison of changes in MVR mortuary patterns between the Pueblo II and Pueblo III Periods is beyond the scope of this study. As established in the previous chapter, and is evident in Figure 8.10, interment in a midden location is still highly favoured in Pueblo III times despite a comparative decline in prevalence. Even so, interrogation of the distribution of the three surface room MCT with Fisher’s Exact Test (3x2) confirms that there is no significant difference between the Pueblo II and Pueblo III patterns by domiciles (p=0.653) or primary burials (p=0.593). Moreover, neither p-value obtained from the N-1 Two-Proportion test regarding PII versus PIII floor use points to a statistically significant difference, again whether calculated by domiciles (0.871) or primary burials (0.133). The latter is closer to a meaningful difference owing to circumstances at 5MT3, where there are no floor depositions but a substantial number of individuals in fill and subfloor contexts. To summarise, statistical analysis confirms that the marginal change in room use prevalence is attributable to the increased use of fill and subfloor contexts, whereas room floor use is essentially stable.

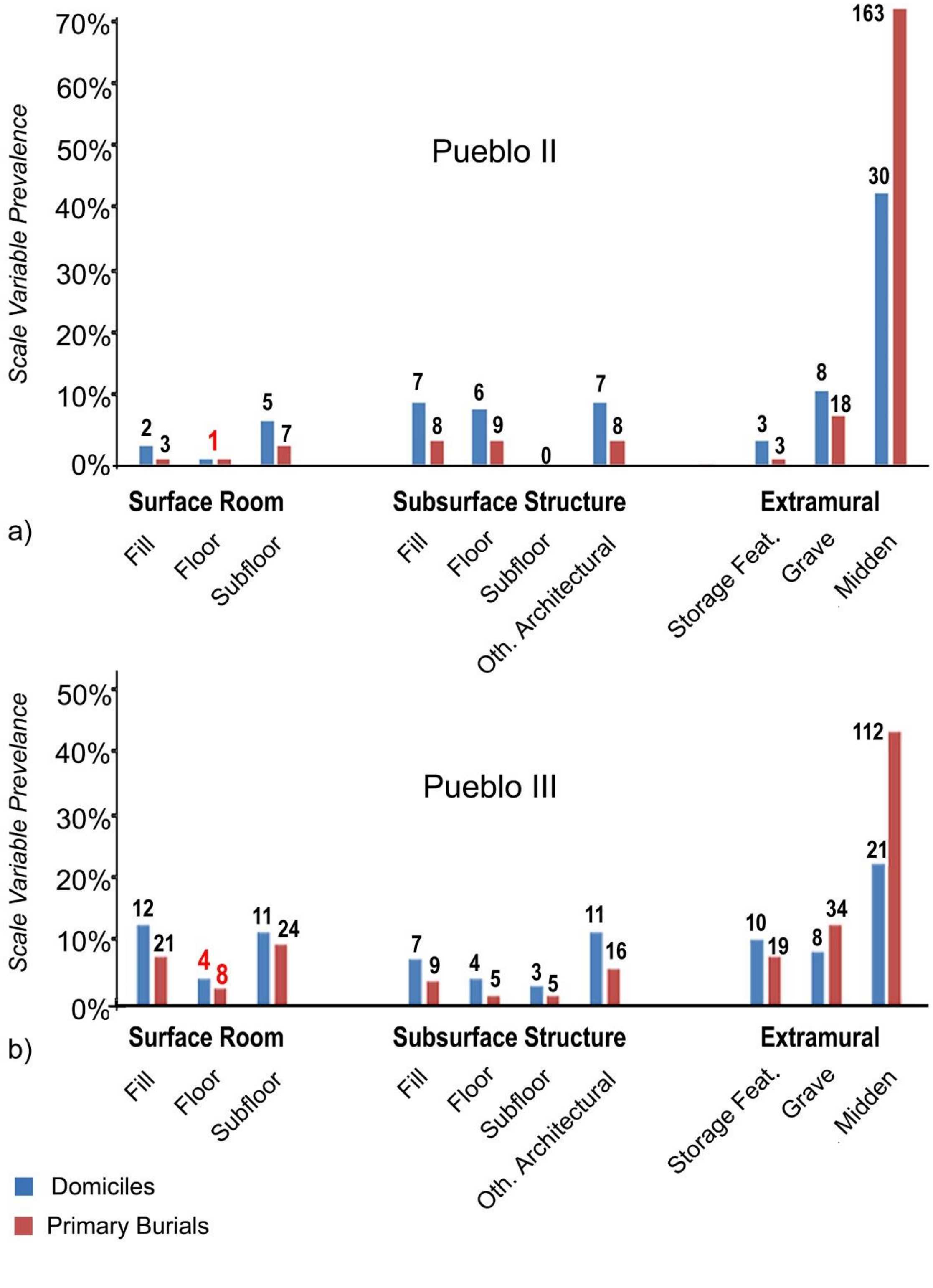


Fig 8.10: Distribution of MVR Pueblo II and Pueblo III mortuary context types, by domiciles and primary burials. Floor counts in red font. Prevalence is calculated per discrete dataset (category and period).

8.3.2 MIDDLE SAN JUAN REGION

8.3.2.1 *Morris 41*

Some 95% (20/21) of the MSJR floor depositions are from Morris 41. As depicted in Figure 8.11 compiled plans of those M41 domiciles with a surface room MCT, those in a floor association are dispersed among eight rooms of five domiciles. Pueblo II primary burials in a room floor context are exceedingly rare, with just one. The scattered bones of a child are on the floor of Room 11, a chamber in a razed roomblock overlain by Building 3. Although subfloor burials are also rare, it is the most common room MCT in Pueblo II times. All 11 Indeterminate PII/III individuals are in a subfloor locus, including 10 from M41.

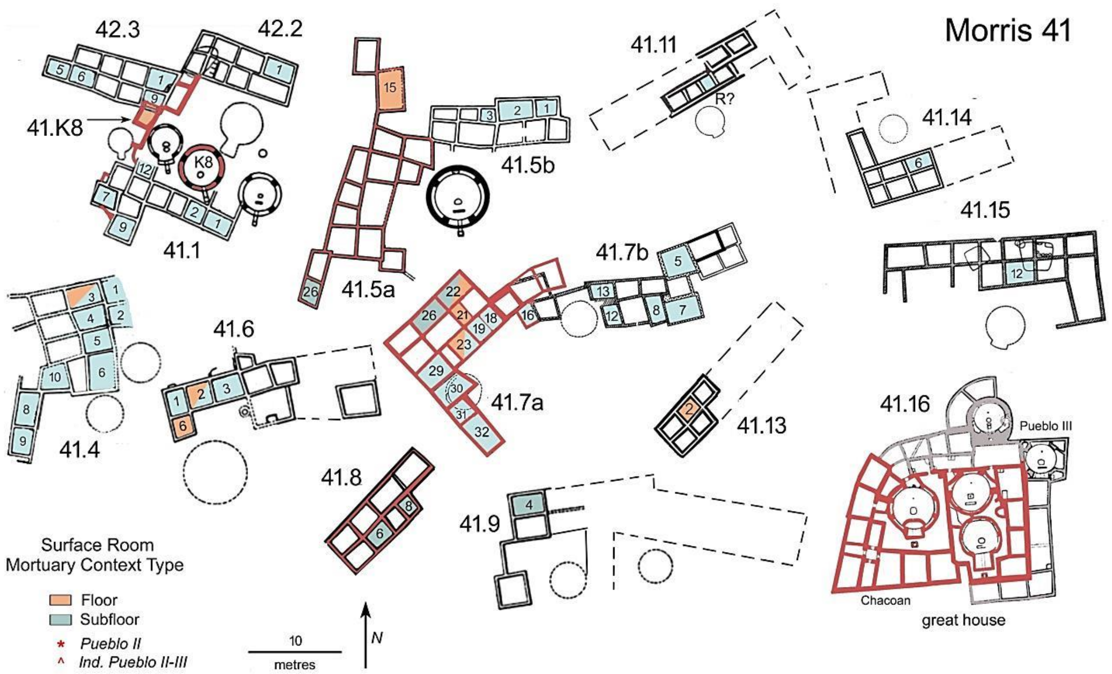


Fig. 8.11: The distribution of primary burials in a floor or subfloor mortuary context at Morris 41, where no individual is unquestionably in room fill.

All but two of the Pueblo III burials are associated with Mesa Verde B/w pottery or sherds. According to Morris (1939:91), two adults and one child “above the floor” of M41.3, Room 3 were “left exposed until covered by natural agencies." An adult and a child in M41.6 were deposited upon the floors of Rooms 2 and 3, after the building had begun to deteriorate (Ibid.: 95). Although most of the rooms in M41.7 contain at least one primary burial, just three (27%) rooms contain a total of four individuals on a floor. According to Morris (Ibid.:100), dogs dragged away bones from two burials in Room 22.

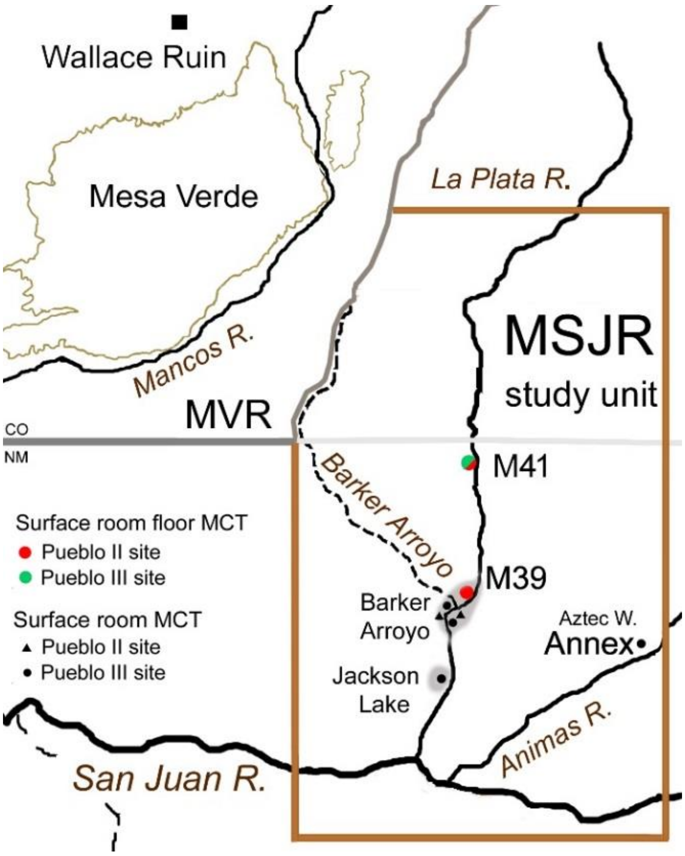
According to the evidence summary in Table 8.6, in total, a subfloor MCT (81%, 86/123) is much more prevalent than a floor location (17%, 20/123) and far more common than a deposition within fill (0%). The nine individuals from the six rooms mentioned above average 1.5 burials per surface room floor. In marked contrast, Room 2 of M41.13 contains 10 burials on a floor or use surface, or half of all MSJR individuals in a domicile context. Unfortunately, Morris's (1939:105) description is scant: "The bodies had been prepared for burial, laid in the chamber, and left for nature to cover with earth. Associated with the bones were five vessels of Mesa Verde age."

Table 8.6: Occurrence of Middle San Juan Region primary burials by surface room mortuary context type, period and domicile.

Domicile	Fill	Floor	Subfloor	Domicile	Fill	Floor	Subfloor
Pueblo II				*Pueblo III*			
LA37605	1			AzAnnex.B4			3
LA65029			1	LA37592			1
Morris 39		1		LA65030	1		2
Morris 41		1	3	Morris 36			6
Indeterminate PII/III				Morris 41		19	73
LA37592			1				
Morris 41			10	Total	2	21	100

8.3.2.2 *MSJR Synopsis*

From the information which is available, a floor mortuary context is unusual in Middle San Juan Region domiciles, involving just 10% (21/226) of all primary burials and 17% (21/123) of those deposited in a surface room context of any type. Only two of the 28 (7%) domiciles with a primary burial in any locus have a floor MCT, though occurrence is a negligible 3% in terms of the total number of assessed domiciles (38). The number of rooms with a primary burial deposit in any location is also low (13%), with floor utilisation again very low (3%) relative to the total number of excavated rooms. The locations of these sites in relation to each other and Wallace Ruin are plotted in the Figure 8.12 landscape map of the MSJR study area. Also plotted are the six domiciles represented by a surface room fill or subfloor mortuary context. No kiva unit at the Aztec West Annex, Barker Arroyo or Jackson Lake locality has a floor MCT. Morris 39, of the Barker Arroyo Locality, has just a single individual (5%) on a room floor. A subfloor

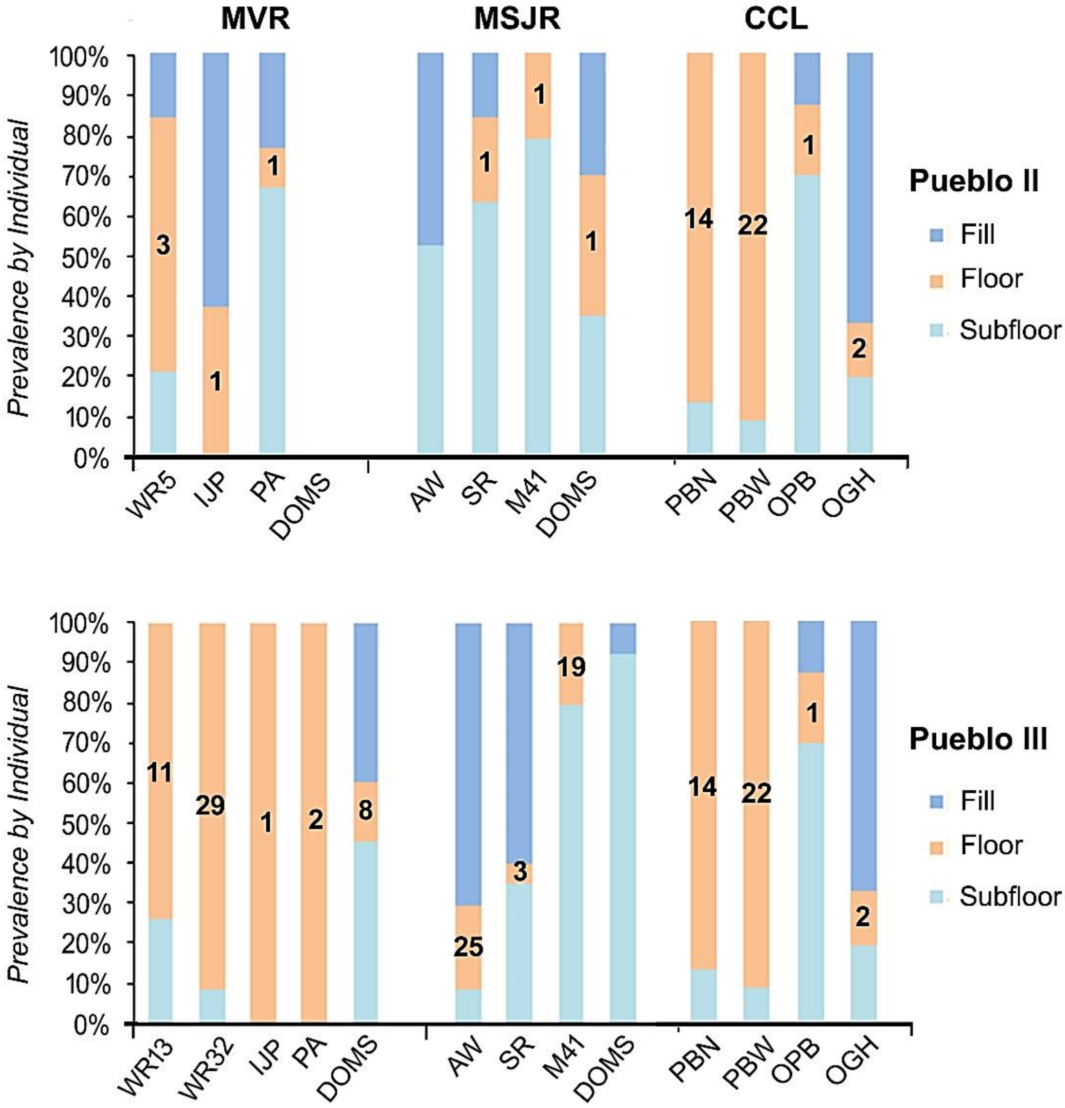


location is most common in these three communities, whereas room fill interments are very rare, with just two (3%).

Fig. 8.12: Locations of MSJR sites with a surface room floor mortuary context.

8.4 Wallace Ruin and SJR Surface Room MCT

The Figure 8.13 chart displays surface room MCT prevalence regarding 477 San Juan Region primary burials located in a specific surface room MCT, by major archaeological study unit and Pueblo II and III Periods. Numbers are provided for floor depositions only. This tabulation includes separate entries for Wallace Ruin's PII depositions (WR5), PIII *in situ* skeletons and Room 18a iLinks (WR13), and the Pueblo III MLNI (WR32). The Aztec West tally also includes 10 individuals on a Room 141 use surface. However, these graphs do not include information about individuals in an unknown room provenience or of uncertain temporal allocation. For clarity's sake, both charts are juxtaposed with Chaco Canyon evidence since this information is also evaluated relative to the Pueblo III results and because Transitional Pueblo II-III individuals could date to either period.



WR	Wallace Ruin	DOMS	Domiciles	PBN	Pueblo Bonito, North Cluster
WR13	13 PIII *in situ* & iLinks	AW	Aztec West	PBW	Pueblo Bonito, West Cluster
WR32	PIII MLNI	SR	Salmon Ruin	OPB	Other Pueblo Bonito
IJP	Ida Jean Pueblo	M41	Morris 41	OGH	Other great house
PA	Pueblo A				

Fig.8.13: Distribution of Wallace Ruin and comparative SRJ primary burials in a surface room mortuary context, by archaeological study unit, vertical provenience and period.

The MVR great houses consist of Wallace Ruin, Ida Jean Pueblo and Pueblo A. The MVR domicile subsets contain data from Sites 5MT3 and 5MV34 though their Pueblo III evidence is evaluated separately in statistical tests. The MSJR group consists of Aztec, Salmon, Morris 41 and MSJR domiciles (DOM); the last includes data from Morris 36 and M39 data but not that from M41. The CCL group consists of the North Cluster (NPB), West Cluster (WPB), Other Pueblo Bonito

(OPB) and pooled Other Great House (OGH) data from Kin Kletso and Pueblo del Arroyo.

8.4.1 PUEBLO II TRENDS

In total, 93 Pueblo II SRJ individuals are in a specific surface room mortuary context. The Transitional Pueblo II/III individuals are included in this group since they predate the Pueblo III use of Wallace Ruin. The representation of primary burial deposits in the North (NPB) and West (WPB) Clusters of Pueblo Bonito dominates Pueblo II mortuary evidence across the expanse of the San Juan Region. The results displayed in Figure 8.13 highlight the distinct emphasis on floors or use surfaces as a deposit locus within these two Bonito burial rooms. A minimum of 36 individuals are on a North or West Cluster room floor, though this is probably an undercount. Each contains subfloor mortuary contexts, though more rarely than is conventionally understood. Burials 13 and Burial 14 of Room 33 are more accurately characterised as in a floor rather than a subfloor MCT. Neither Cluster contains an indisputable room fill MCT, but the accuracy of this finding is uncertain. On the other hand, no *in situ* individual in either of these locations is in a cultural fill deposit, and just one among the six burials in other sections of Pueblo Bonito is in this MCT. Moreover, each Cluster's extremely high prevalence (88%, 92%) of floor MCT is not duplicated in Bonito's non-Cluster chambers (OPB) or other Canyon great houses (OGH). From Judd's description, the Transitional PII-III individuals at del Arroyo were definitely deposited within cultural fill, and this may be the case at Kin Kletso. However, in a similar vein to the development of Chaco-McElmo pottery style or the shift to deposit of trash within rooms (Wills, 2009), this location choice may represent post-Phenomenon, NSJR occupation or influences.

This Bonito "burial room" pattern is also distinct from mortuary location choices made in the Mesa Verde and Middle San Juan regions. The roughly 100 sites assessed, counting domiciles, great houses and the Lakeview Group, are represented by no more than eight floor depositions in total, so about half the number just within Bonito's Room 33. This circumstance is consistent with the rarity of Pueblo II surface room depositions, regardless of site type. The 14 individuals in a room MCT, including those in an indeterminate vertical provenience, average just 2.3 surface room depositions per site (6). The inclusion of all Pueblo II-III individuals increases the MSJR sum to 44 burials from seven sites, for an average of 6.3 individuals per site. However, this same adjustment means that Bonito has 97 individuals per site. Calculating by domiciles means that the proportion of individuals per site decreases to about two burials per great house/domicile.

In contrast to the above, MVR and MSJR surface room MCT patterns are very similar to those associated with Bonito's non-Cluster rooms and other Canyon great houses. A subfloor location is privileged, though a room fill locus is utilised in every site but Morris 39 and Morris 41. Nevertheless, these very small numbers highlight the rare mortuary use of room floors during Pueblo II times, regardless of the nature of the Chacoan association and number of rooms available. The also serve to emphasise the anomaly of Pueblo Bonito's two mortuary clusters. Table 8.7 presents findings from 52 sets of contingencies evaluated using Fisher's Exact Test, by which each array (fill, floor and subfloor) from a total of 16 groups or subgroups tested in turn. The exclusion of the many remains in an undetermined MCT means that the accuracy of these results is open to question. Even so, the likelihood is that most of the Pueblo Bonito individuals are on a floor or use surface since neither Cluster contains credible evidence of a deposition within a fill unit. Small samples in other Pueblo II subgroups unquestionably effect confidence in the significance of the test results, since several number fewer than six individuals. As is noted below, the re-allocation of one individual to another category changes a result from not statistically different to meaningful, or vice versa. In short, the position taken here is that the Pueblo II results merely point to similarities or differences between groups and are not construed as definitive.

In terms of the admittedly scant MVR evidence, Wallace Ruin has three times as many deposits on a surface room floor than both Ida Jean Pueblo and the MVR domiciles group. Yet, a key finding is that the Pueblo II mortuary pattern at Wallace Ruin is not statistically significantly different to these groups or any other evaluated Pueblo II community, for that matter. On the other hand, the re-allocation of iLink 366 to a floor MCT, a plausible interpretation, yields a result in which the P2WR array (0,4,1) is statistically significantly different to that of MVR domiciles (p=0.0283). The P2WR room fill and room subfloor contexts are less common than their regional domicile equivalents, but are not particularly distinctive when sampling bias is taken into account.

Table 8.7: Fisher's Exact Test (2 x 3 contingency) p-values comparing SJR surface room MCT arrays for Pueblo II groups and subgroups. Lowry (2001-2017) online calculator, 95% C. Red font designates a significant difference (p <0.05).

Site/subgroups	p >0.05	p <0.05	Site/subgroups	p >0.05	p <0.05
WR v MVR GH (IJP)	0.6785		PBN v PBW	1	
WR v MVR DM	0.1608		PBN v OPB		0.0043
WR v PB	0.1405		PBW v OPB		0.0008
WR v PBN	0.1278		PBN v OGH		< 0.0001
WR v PBW			OPB v OGH		0.0479
WR v OPB	0.2640		PB v MSJR GH		0.0009
WR v OGH			PBN v MSJR GH		0.0017
WR v AW	0.4285		PBW v MSJR GH		0.0002
WR v SR	0.1904		PB v MSJR DM		0.0074
WR v M41	0.2063		PBN v MSJR DM		0.0103
WR v MSJR DM	0.2499		OPB/OGH v MSJR DM	0.6947	
			PB v M41		0.0384
LVG v PB		0.011	PBN v M41		0.0319
LVG v PBN		0.043	PBW V M41		0.0114
LVG v PBW		0.006	OPB v M41	0.9999	
LVG v OPB	0.1341		OGH v M41		0.0282
LVG v OGH	0.2015				
LVG v MSJR GH	0.1064		MSJR GH v MSJR DM	0.8164	
LVG v MVR DM	0.2539		AW v MSJR DM	0.4444	
LVG v M41	0.2307		SR v MSJR DM	0.5333	
LVG v MSJR DM	0.1272		AW v M41	0.3333	
			SR V M41	0.7142	
MVR DM v PB		< 0.0001			
MVR DM v PBN		< 0.0001			
MVR DM v PBW		< 0.0001			
MVR DM v OPB	0.9999				
MVR DM v OGH					
MVR DM v MSJR GH	1				
MVR DM v AW	0.9999				
MVR DM v SR	0.9999				
MVR DM v M41	0.5384				
MVR DM v MSJR DM	0.9999				

DM domicile; GH great house; IJP Ida Jean Pueblo; LVG Lakeview Group; AZ: Aztec West; SR Salmon Ruin; M41 Morris 41; PBN Pueblo Bonito North; PBW Pueblo Bonito West; OPB Other Pueblo Bonito; OGH (Kin Kletso & P.del Arroyo); MSJR DM (Aztec W Annex, Morris 39, Barker Arroyo & Jackson Lake localities)

Yet, when the significance threshold is set at 90%, then Wallace is statistically different to both the West Cluster configuration and the OGH group. Independent assessment of each MCT variable with the N-1 Test shows that the differences in the P2WR v PBW room fill (p=0.172), floor (p=0.127) or subfloor proportions (p=1) are not statistically significant, though they are close to the less restrictive but probably still meaningful 90% threshold (p<0.10). Of note, the re-allocation of iLink 366 to a floor MCT means that there is no statistically significant difference (Fisher's) in the P2WR MCT arrays concerning all Pueblo Bonito individuals (*p*=1), the North Cluster subgroup (*p*=1), or the somewhat different PBW configuration (*p*=0.4460).

Moreover, the addition of just two burials in an Ida Jean fill context distinguishes the Lakeview Group from floor-dominated MCT arrays at Pueblo Bonito. The Chaco Canyon groups that have comparatively more individuals in a subfloor (OPB) or fill (OGH) locus are more similar to the mortuary use of rooms in the Lakeview Group, MVR and MSJR domiciles, MSJR great houses, and M41.

The Fisher's tests evaluate mortuary pattern differences between two groups as a whole, and while some proportions are obviously different, such ad hoc observations do not provide a sound indication of the source of MCT location variation between groups. Accordingly, the fill, floor and subfloor pairs are evaluated with the N-1 Test for all primary burials in a specific room MCT, in total, and by four subgroups. As presented in Table 8.8, the first subgroup pertains to location preference in Bonito's Clusters. The second (nonCluster) pertains to all other suitable proveniences, the third focuses upon the Lakeview Group and the last centres upon Wallace Ruin. As above, Transitional PII-III but not Indeterminate Pueblo II-III individuals are included in the nonCluster assays.

Table 8.8: N-1 Two-Proportion Test regarding Pueblo II surface room MCT preference. Red font designates a significant difference (*p* <0.05).

	Total (n=93)	PBC (n=40)	nonCluster (n=53)	LVG (n=8)	WR (n=5)	WR[a] (n=5)
Floor v Fill	<0.001	0	0.017	0.626	0.221	0.014
Floor v Subfloor	0.006	0	0.007	0.117	0.221	0.072
Fill v Subfloor	0.315	0.040	0.731	0.264	1	1

[a] with iLink 366 of Wallace Ruin allocated to a floor MCT

PBC Pueblo Bonito Clusters; nonCluster excluding PBC; LVG Lakeview Group

In total, the prevalence of a floor context versus a subfloor or fill location is statistically significant, with scant chance that the observed differences reflect sampling error. Although the fill versus subfloor result also scores as a significant difference for Cluster MCT, the *p*-value (0.041) is on the threshold of a finding of no significant difference. In contrast, differences in these proportions are not meaningful in any other of these test groups, even *if* $p<0.10$. From this evidence, a room floor location has greatest bearing on statistically significant differences between Pueblo II MCT arrays. Among these tests, only the floor v fill or subfloor proportions at the Lakeview Group and Wallace are not meaningful. However, findings pertaining to the three well-populated groupings are much more reliable since they are not subject to significance fluctuations upon such minor adjustments as the shifting of iLink 366 to a room floor MCT.

8.4.2 PUEBLO III TRENDS

Pueblo III representation for specific room MCT is substantial, with a minimum of 362 individuals. However, other than Wallace Ruin, no great house, or community, with a moderate-sized burial population approaches the prevalence of room floor MCT at Pueblo Bonito. The Bonito and Wallace rates are lower than the 100% prevalence occurring at Pueblo A and Ida Jean Pueblo, but those burial populations comprise just two and one individual, respectively. Moreover, while room MCT occurrence in the completely excavated Pueblo A is firmly established, the same cannot be said for the latter. Wallace's better represented floor depositions meet or exceed 70% of the individuals observed, whether counted by *in situ* remains (70%, 7/10), when including the disturbed but not re-deposited Room 18a individuals (10/13, 77%), or the Pueblo III MNLI of 32 (91%, 29/32). Each result is more than three times the next-highest floor MCT prevalence at both Morris 41 (21%, 19/92) and Aztec West (14%, 15/110). As noted in the evidence presentation for Aztec, 10 potential floor (use surface) burial allocations in Room 141 are suspect because they involve an oral tradition reported to Morris rather than his direct observation. Even so, the maximum potential prevalence at Aztec (30%, 33/110) is still no more than about half of Wallace's lowest prevalence calculation. Sample size is not a factor since these two MSJR sites have the SJR's largest burial populations, with 100 or more burials in a surface room MCT.

The distinction between Wallace and MVR domiciles regarding utilisation of floor mortuary location is particularly noteworthy. A floor MCT is about five to six times more common at Wallace compared to the latter group's prevalence of 15 percent. This is a maximum figure since several included floor allocations are uncertain, but the salient point is that there is good confidence that the domicile evidence is otherwise reasonably representative of MVR mortuary location choices. Among MVR domicile rooms, the proportions of fill (21/53) and subfloor (24/53) MCT are almost balanced, in contrast to the skewed proportions observed in all other tested groups. Another point of significance is that the 22 MCT selections at 5MT3 are almost completely different to those observed in Wallace's West Arm/Annex. Despite having surface room burial populations of like size, 5MT3 has no floor depositions. Rather, a subfloor location was strongly preferred, with 65% (15/23) of the individuals in this MCT compared to Wallace's maximum rate of 30% (3/10) determined from *in situ* skeletons or the 9% (3/32) based on its MLNI. Neither the floor nor subfloor proportions involves excavation bias since 5MT3 is completely excavated. In addition, while Site 5MV34, also completely excavated, has two floor burials (29%), the majority (57%, 4) of its seven PIII surface room depositions are in a subfloor locus.

A subfloor location is disproportionately emphasised in MSJR domiciles, and, most convincingly, Morris 41. This site has no depositions in fill, a circumstance mirrored only at Pueblo Bonito and Wallace Ruin. Given that Morris excavated 109 of these surface room depositions after his work at Aztec Ruin, where he identified all three surface room verticals, sampling or observer error is unlikely. Rather, the absence of such evidence probably does signal deliberate decisions regarding mortuary location selection. In contrast to Wallace and Bonito's clusters, the pronounced tendencies at the great houses of Aztec (71%, 85), Salmon (60%, 35) and Pueblo del Arroyo (80%, 8) involves a mortuary context associated with cultural fill. However, as discussed previously, it is uncertain when some of the Aztec fill deposits represent a mortuary treatment or a subsequent event lacking mortuary connotations.

Owing to their larger sample sizes, the results of tests of significance are more credible for Pueblo III MCT arrays. For most comparisons, Fisher's Exact Test (3x2 contingency) evaluates differences between sites or groups. However, Yate's Chi-Square Test (Preacher, 2001) is used for comparisons involving pooled MSRJ data since the total number of depositions from both groups exceeds 300 individuals. The N-1 Two-Proportion Test evaluates occurrence by specific room MCT (i.e., MCT v MCT) use per site or region. Findings are summarised in Tables 8.9 and 8.10. In these analyses, the Lakeview Group is not tested separately since this effectively increases the Wallace count by one. Likewise, since all depositions in a utilised MVR great house are on a room floor, this subgroup is compared to another group only when there is a chance that the slight increase in floor representation might modify a *p*-value.

These results confirm the findings described above. Regardless of which P3WR subgroup is tested, Wallace Ruin's floor-dominated surface room MCT array is similar or very similar only to the floor-dominated arrays at Pueblo Bonito and to the MVR great houses (Ida Jean Pueblo and Pueblo A). Of these, the Bonito comparison is most credible since each test group numbers more than 10 individuals. Moreover, the WR West Arm array is very significantly different to the surface room mortuary location choices observed in MVR domiciles, as well as all other MSJR and CCL great houses, with all *p*-values at or near zero. As noted previously, there is good confidence that these statistical distinctions are accurate reflections of mortuary choices exercised in MVR domiciles and the fully excavated MSJR great houses. Of the sites specifically tested, the 5MV34 array is the only one in which the difference is not statistically significant, though it is when a 90% confidence level is employed. Another key point is that the distribution of room MCT in all other great houses, domicile groups and the specific domicile sites of M41 and 5MT3 are very significantly different to that of the Bonito Cluster arrays.

Surface room mortuary location patterns are extremely variable amongst Aztec, Salmon, M41 and 5MT3 and both regional domicile groups owing to a pronounced but varying preference for a fill or subfloor MCT. Appraisal of pooled Pueblo III data and various groups in the data provided in Table 8.10 evidences that the occurrence of a floor MCT (72) is significantly different from a fill (144) and a subfloor (146) location. Only two results are not at or just above a *p*-value of zero for floor v fill or subfloor comparisons. The MSJR domicile score for the fill (1) v floor (0) relationship is inconsequential owing to the very poor representation of both categories.

Table 8.9: Fisher Exact Test *p* -values for surface room MCT arrays involving Wallace Ruin, other Pueblo III groups and Pueblo II Chaco Canyon groups. Lowry (2001-2017) online calculator, 95% C. Red font designates a signficant difference ($p<0.05$).

	p >0.05	<0.05		>0.05	<0.05
WR (ob/es) v MVR GH	0.999		PB v AZ		< 0.0001
WR (ob/es) v MVR DM		<0.0001; 0	PBN v AZ		< 0.0001
WR (ob/es) v PB	0.779/0.412		PBW v AZ		< 0.0001
WR (ob/es) v PBN	0.999/0.643		PB v SR		< 0.0001
WR (ob/es) v PBW	0.642/0.999		PBN v SR		< 0.0001
WR (ob/es) v OPB/OGH		0	PBW v SR		< 0.0001
WR (ob/es) v OPB		0.0180/0.0006	PB v M41		< 0.0001
WR (ob/es) v OGH		<0.0001; 0	PBN v M41		< 0.0001
WR (ob/es) v AW		0/0	PBW v M41		< 0.0001
WR (ob/es) v SR		0/0	PB v MSJR DM		0
WR (ob/es) v M41		0/0	PBN v MSJR DM		< 0.0001
WR (ob/es) v MSJR DM		0/0	OPB/OGH v MSJR DM		0.0025
WR (ob/es) v 5MT3		0/0	OGH v M41		0
WR (ob/es) v 5MV34	0.070	0.002	OPB v M41	0.076	
			PB v 5MT3		0
MVR GH v PBW	0.645/0.999		PBN v 5MT3		0
			PB v 5MV34		0.0107
MVR DM v PB		0	OPB v 5MT3	0.321	
MVR DM v PBN		0	OPB v 5MV34	1	
MVR DM v PBW		0	OGH v 5MT3		0.0023
MVR DM v OPB	0.516		OGH v 5MV34		0.0437
MVR DM v OGH	0.105				
MVR DM v OPB/OGH	0.481		AW v SR		<0.0001
MVR DM v AW		0/0	AZ v M41		0
MVR DM v SR		0.048	SR v M41		0
MVR DM v M41		0	AW v MSJR DM		<0.0001
MVR DM v MSJR DM		0.015	SR v MSJR DM		0.0011
5MT3 v M41		0	M41 v MSJR DM		0.0315

DM domicile; GH great house; IJP Ida Jean Pueblo; LVG Lakeview Group; AZ: Aztec West; SR Salmon Ruin; M41 Morris 41; PBN Pueblo Bonito North; PBW Pueblo Bonito West; OPB Other Pueblo Bonito; OGH (Kin Kletso & P.del Arroyo); MSJR DM (Aztec W Annex, Morris 39, Barker Arroyo & Jackson Lake localities); ob/es observed/estimated

Table 8.10: N-1 Two-Proportion Test regarding Pueblo III surface room MCT preference. Suaro, 2012 online calculator; significant difference in red font ($p<0.05$).

S Room MCT	Tot. PIII (n=362)	WR (n=13)	MVR D (n=53)	5MT3 (n=22)	AW (n=110)	SR (n=60)	M41 (n=93)	MSJR D (n=13)
Floor v Fill	0	0.008	0.005	0.004	0	0	0	1
Floor v Subfloor	0	0.007	0	0	0.289	0.004	0.008	0
Fill v Subfloor	0.879	0.071	0.557	0.017	0	0.006	0	0.002

D domiciles

The well-represented burials of Aztec West comprise the only group for which there is no statistically meaningful difference in the proportions of burials in a subfloor versus a floor location; however, this result is derived only when Room 141's 10 "rifled" individuals are excluded. When counted as floor depositions, then the very low revised *p*-value (0.006) means that the higher prevalence of individuals in a floor versus a subfloor context is meaningful. In contrast, there is essentially no change in the *p*-value (0.001) when comparing the maximum number of floor depositions (43/133) versus re-allocated fill MCT (79/133). Pueblo A's 0.333 p-value for a floor versus fill or subfloor location is admittedly based on just two individuals (0,2,0) and the IJP MCT array (Unk.,1, Unk.) is not suitable for this appraisal. Several fill versus subfloor results are also very different, but the overall trend indicates that the utilisation of these two locations as a mortuary location was far more common than the use of a room floor.

8.5 Conclusions: The anomalous floor MCT at Wallace Ruin and Pueblo Bonito

Before returning to the considerations posed at the beginning of this chapter, the salient points of this analysis are summarised. As at Wallace, the evidence for a pervasive and prolonged practice in which corpses were deposited in an open space is compelling for Pueblo Bonito's North Cluster remains, though somewhat less evident for West Cluster depositions. Still, there is no evidence that the covering of bodies with cultural fill (refuse) or significant deposits of sediments played a significant role in the Pueblo Bonito mortuary program. The existence of this mortuary choice is less clear-cut for the four MSJR individuals in a floor MCT, or possibly six when including Pueblo II-Pueblo III remains. The described microenvironment of Burial 19 (PII-PIII) of Aztec West as "covered by drift sand" (Morris, 1934:161) is the only one of these in which there is sufficient evidence to draw such an inference. This tally does not include nine Pueblo II-III individuals from Aztec West who are on or just above a floor though covered with refuse at discovery. Field photographs indicate that least two of these evidence bone displacements that are indicative of decomposition in an open space. The marked preference for the deposit of primary burials on a surface room floor is specific to the North and West Clusters of Pueblo Bonito. Its variant Chacoan mortuary program involved the deposit of numerous primary burials on a floor or use surface of multiple surface rooms. This practice was established in the late AD 800s and maintained through much of the 12th Century.

In addition to Wallace, two MVR great houses have depositions on a floor, but the scale of use at IJP and Pueblo A is very scant in terms of burials and rooms. This pattern also holds among the region's domiciles. Though there is a slightly higher prevalence of floor use in Pueblo III times, the overall prevalence is still very low regardless of whether assessed buildings are great houses or domiciles. It is also important to bear in mind that the Pueblo III depositions at Pueblo A are associated with the residential use of that former great house, in contrast to Wallace Ruin and Ida Jean Pueblo.

Although the major MSJR satellite great houses of Salmon Ruin and Aztec West have numerous intramural depositions, floors seldom serve as a mortuary locus. Rather, both privilege depositions in room fill, though Salmon contains a considerable number of subfloor burials whereas Aztec Ruin has relatively few. The determination that Burial 14 of Pueblo Bonito's Room 33 is on a room floor is thus particularly important given the interpretations that the "Bow Priest" and "Warrior" from Salmon and Aztec hold some sort of enhanced status. Assuming so, the decision to inter them in subfloor pits does not reflect an attempt to duplicate the mortuary circumstances of #14 in terms of deposition location. The two MSJR indigenous residential complexes that have an emulation (hamlet Morris 39) or Chacoan great house (village Morris 41) have no primary burial deposits in a great house surface room MCT, from any time. Likewise, domiciles from these two complexes and dispersed La Plata Valley habitations between the large satellite great houses and Wallace show very limited mortuary use of floors but a distinct preference for a subfloor MCT. That the Pueblo II representation for MSJR room MCT is quite small, with just 15 individuals, is also significant. Even when including all Indeterminate Pueblo II-III remains, Salmon Ruin still has no more than six intramural depositions and Aztec Ruin perhaps 18. Individuals who were deeply versed in Chacoan building techniques established and inhabited both of these satellite Chaco great house communities (Reed, 2008a). Yet, neither great house has definite evidence of a Pueblo II primary burial on a room floor, though there might be two or three when including very poorly represented skeletal remains and Pueblo II-III individuals. The south great house of Morris 41 provides the only architectural evidence of a direct link to Chaco builders in this indigenous La Plata Valley village. Morris identifies a hachured water jar in a room subsequently overlain by Building 3 as of "Chaco-style." The adjacent Room 11 contains the only Pueblo II individual on room floor; this child may be associated with a bird effigy vessel, a form which, according to Morris, reached its peak in "Early Pueblo III-Chaco" times, which archaeologists now deem as Late Pueblo II. These could be Gallup white ware vessels fabricated in Chaco Canyon, or they may instead be local Chaco-McElmo variants; this ware had not been identified at the time of Morris' writings. Yet, assuming that these pots were built in Chaco Canyon, their presence may simply represent an exchange network rather than migration (Reed, 2008b).

Accordingly, these Chaco migrants did not follow historic precedent or ongoing practice observed for the depositions in Bonito's North and West Clusters. This is not necessarily surprising considering that this particular mortuary program was not adopted in any of the other excavated great houses of Chaco Canyon. Instead, their use of surface rooms is similar to that of Pueblo Bonito's non-Cluster rooms: that is, a small number of individuals in total, typically one individual per room, and the utilisation of all three of the surface room MCT.

Interestingly, the two satellite great house sites show a preference for deposit in room fill, though a subfloor location is also common at Salmon Ruin. On the other hand, the selection of a subfloor locus is very pronounced at Morris 41. These mixed results suggest that there were no "organisational principles" that influenced or linked MSJR mortuary decisions during Pueblo III times. Of these three variables, the only resonance to Pueblo Bonito's burial room clusters, is, perhaps, the concept of the use of a surface room. However, the use of surface rooms in La Plata sites and MVR sites with no ostensible connection to Pueblo Bonito suggests that this choice is independent of Chacoan ideas or practices.

The pattern of Pueblo II mortuary location selection at Wallace Ruin is essentially equivalent to that occurring in Pueblo Bonito rooms external to either of its burial room clusters. It is also significantly similar to the MCT variables observed when Chacoan immigrants, and some locals, occupied the satellite great houses of Aztec Ruin and Salmon Ruin. It is unknown if the Pueblo II primary burials in the Wallace Ruin great house are the offspring of Chacoan migrants or locals who resided there and performed services on behalf of the Chacoan regional network.

In marked contrast, significance tests conclusively establish that Wallace Ruin's Pueblo III MCT pattern is similar only to that utilised for Pueblo Bonito's Cluster depositions. Moreover, as at Pueblo Bonito and Morris 41, there is no indisputable evidence for interments within room fill. Just within Wallace's excavated rooms, the number of Pueblo III primary burial deposits on a room floor is probably in the upper twenties, at least. Assuming so, that MCT array is an even closer match to the ratio of floor to subfloor primary burials in Pueblo Bonito's two Clusters. Although there are hints that this MCT preference was adopted in the nearby Lakeview Group great houses of Ida Jean Pueblo and possibly Haynie Ruin, the extent or quality of the excavation research is insufficient to draw a firm conclusion.

This evaluation provides robust evidence that Wallace's Pueblo III mortuary program is similar to that occurring in Pueblo Bonito burial clusters in terms of how rooms were used, which lends support for the Chacoan Revival Hypothesis. On the other hand, there are further grounds to reject this notion in terms of the premise that a 13th Century revitalisation movement was pan-regional in extent, given the significant differences in how rooms were utilised at Aztec West and Salmon Ruin, which Bradley specifically mentions in the hypothesis premises. The demographic evidence presented in the next chapter will further establish the variant nature of Wallace compared to these two sites, as well as its demographic profile relative to other SJR sites, including Bonito's Clusters.

CHAPTER 9

WALLACE RUIN NON-VARIANT: AGE AND SEX

9.1 Introduction

The potential that the age or sex of Pueblo III deceased deposited at Wallace has implications for both the Cohort Hypothesis and the notion that this mortuary behaviour is associated with the formulation, or reformulation, of a Chacoan house society. To review, the former centres upon the possibility that selection for mortuary deposit at Wallace is based upon the deceased's age group, sex or combination of these two variables. In the latter case, Mills (2008; 2015) references the adult-centred demographic composition of burials in the two burial clusters of Pueblo Bonito (Akins, 1986; Marden, 2011) as one of the signifiers of ancestor worship practices integral to this type of social organisation. From the information provided in the detailed analyses of Wallace skeletal remains, it is evident that that the Pueblo III individuals at Wallace are not members of a single age group, the same sex or combination thereof. Evidence has also been presented to demonstrate that the P2WR and P3WR mortality profiles are substantially different. What has yet to be established is how those demographic trends compare to those of other SJR burial populations, overall and in terms of the surface room representation, including depositions in a floor MCT.

These analyses will show that although manifesting quite different attributes, the Pueblo II and Pueblo III demographic patterns at Wallace are not particularly distinctive. Although the Pueblo II age structure is not inconsistent with the notion of a cohort, the scant numbers involved lack credibility for such an interpretation. The more populated Pueblo III age-sex structure with a full range complement of age groups and both sexes is definitely not consistent with attributes of a cohort. Instead, it is confirmed that that the North Cluster's age structure is significantly different to all other San Juan Region burial populations evaluated.

9.1.1 BACKGROUND

Nearly one thousand (972) Pueblo II and III members of the San Juan Region skeletal population are suitable for a reliable estimation of age. In addition, more than 400 (410) have a diagnosis of sex. This database, comprised primarily of demographic evidence reported by numerous researchers, constitutes the largest Four Corners Ancestral Pueblo dataset to date. Much of the material addressed in this chapter centres upon two sets of juxtaposed charts that document age structures of SJR individuals, by period, major archaeological region, and the principal sites or groups appraised in this study. In each case, the upper chart (a) reports data pertaining to depositions from all surface room proveniences and the lower chart (b) captures information regarding burials in a room floor MCT. Also included is the MVR age structure, depicted as a stacked column for comparisons. This profile is derived from data regarding 416 Pueblo II and III MVR burials from any of the 10 mortuary locations evaluated in this study. Unfortunately, accurate comparative information on the presence of foetal/neonates is not available since this level of detail was reported inconsistently, as are refined adult age categories. Accordingly, foetal/neonates are included in the infant category and all adults are pooled in one age group.

An important point is that the MVR demographic evidence is the most reliable of the three major SJR study units, in general. Physical anthropologists and physicians employing methods and classification standards developed after 1950 performed most of the MVR assessments. In contrast, a large proportion (~75%) of the MSJR and CCL determinations were, ostensibly, made by archaeologists Morris (1924; 1939) and Judd (1954) in the early decades of the 20th century, using methods and criteria that are not described. In addition, the statistical test for confidence for the MVR’s MCT domicile evidence means that it is reasonable to infer that this profile is likewise reasonably representative of demographic trends concerning the SJR subgroup, presumably, most closely connected to Wallace during Pueblo III times. The final point of significance is that the MVR age structure characteristics are similar to those evidenced in the Latin American Mortality Model (United Nations, 1982), which captures observed age class distribution in extant communities of developing countries. Though formal demographic analyses are unusual in Ancestral Pueblo research, when conducted, researchers have relied upon life tables generated either by Coale and Demeney (1966) or Weiss (1973), as in the case of Hinkes' (1983) analysis of the subadults of Grasshopper Pueblo. However, these tables draw substantially from data derived from historical European countries and differ to patterns observed in developing countries. Summarising Zhao (2007), the Latin American model is characterised by a very high infant death rate (usually between 30 and 50 per cent) that gradually declines through childhood and then reaches lowest mortality around 14 years of age. A marked rise in young adulthood mortality follows this nadir, after which death rates drop slowly throughout adulthood. Subadult mortality ranges from 30 to 70 percent.

9.1.2 APPROACH

The aims of this chapter are limited in scope. The intent is merely to identify a significant variation from typical demographic trends. It is not to conduct an intensive analysis of demographic trends within the San Juan Region or its subunits in a fine-grained bioarchaeological analysis of differential stress, for example. Rather, the approach taken centres upon obtaining answers to three key questions. Of primary importance, does the age-sex structure at Wallace stand out from sites mentioned above, other SJR great houses or MVR and MSJR domiciles? Is the observed variation between Wallace and MJSR sites in terms of room or floor MCT prevalence also expressed in demographic variables? Also, given Pueblo Bonito's centrality to the Phenomenon and Mill's (2015) house society interpretation, in what ways do the Clusters' demographic profiles vary relative to other great houses and domicile groups?

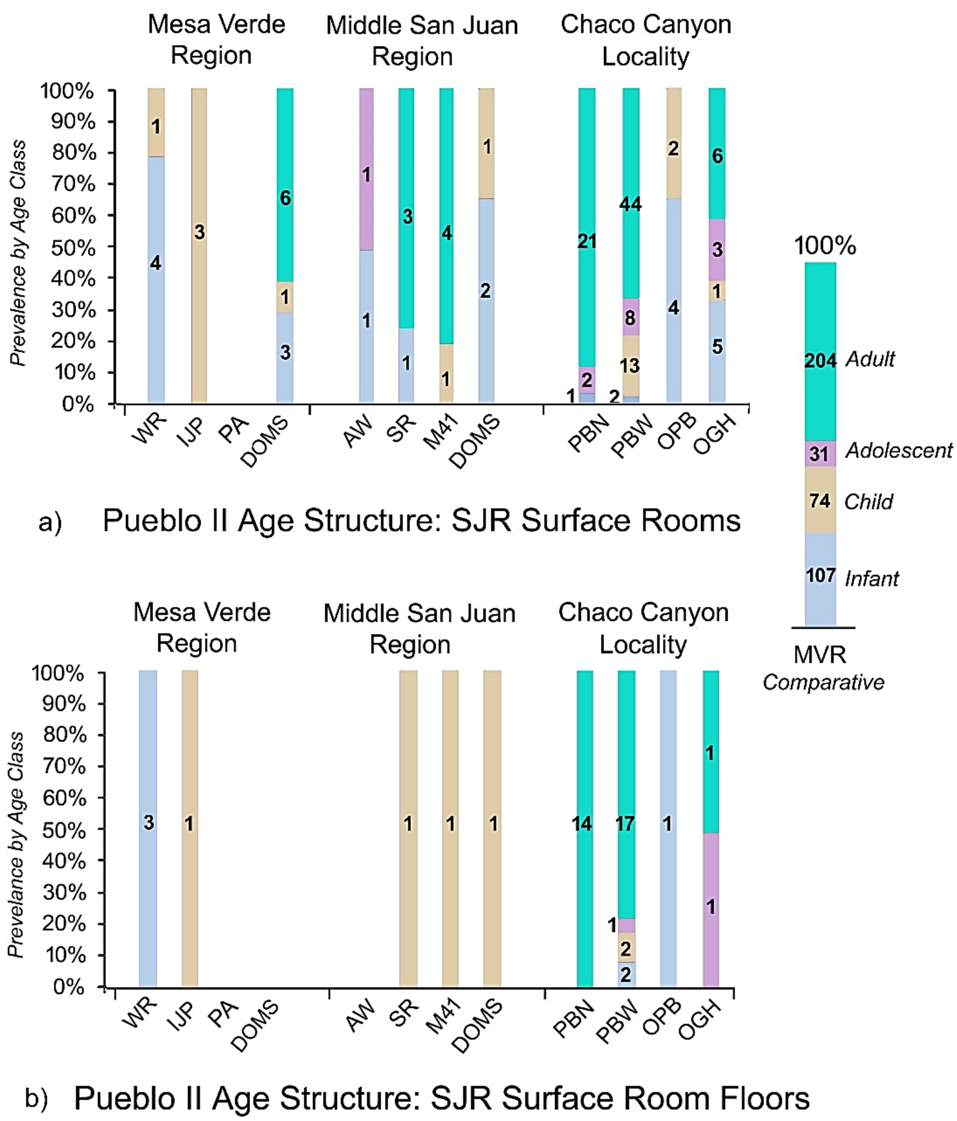
9.2 Pueblo II

9.2.1 SURFACE ROOMS

9.2.1.1 *Age Structure*

It is first worth evaluating the age structure of all primary burials in a room MCT to address the possibility that the primary factor pertaining to age group selection involves deposition within a room as opposed to a floor association. Although the occurrence of subfloor burial HR 9 indicates that this is not the case at Wallace, a single individual is insufficient to refute this possibility. In addition to the five subadults from Wallace, the 141 Pueblo II skeletal remains with an estimation of age include 14 Transitional PII-III burials from Kin Kletso and Pueblo del Arroyo and all individuals from any specific or indeterminate room MCT. Setting sample size factors aside, the information in Figure 9.1 shows that multiple age groups are represented in room depositions among the 11 sites with at least one Pueblo II room MCT, apart from Ida Jean. However, only the MVR domicile and OGH groups have age structures that approximate the proportions entailed in the MVR age structure, which, as discussed above, is similar to the observed normal mortality curve in developing societies. The lack of an adolescent is unremarkable considering the infrequency (7%) of this age group in the MVR population and the Latin American model. Five burial populations, including those from both Lakeview Group sites, are exclusively populated by non-adults, with four represented by just infants or children. Adults are predominant in the four remaining mortality profiles, all of which involve a MSJR or CCL great house.

More specific analyses of the associations between a surface room provenience and age group membership and provided in Table 9.1, which summarises evidence of age class in a specific or indeterminate room MCT provenience for all SJR Pueblo II burials. Floor depositions are addressed separately, but all four major age classes are in all four of these MCT subdivisions. The adolescent age group has very few individuals, but some of the 26 individuals in the Adolescent/Adult group, identified by Judd only as adolescent or adult, may be of this age. From these two assessments, it is evident that all age groups were deposited in surface rooms, though very skewed subadult or adult age grading characterises the mortality profiles for most sites or groups. Pooling data to form two readily distinguishable groups (Infant-Child v Adolescent-Adult) minimises the effects of inter-observer variation. Fisher's Exact Test results in which these two groups are evaluated in terms of the three specific MCT types and by all four context variables yields *p*-values (<0.001) that signify that, in both cases, the skew towards the older age group is statistically significant at the 95% threshold.



WR	Wallace Ruin	PBN	Pueblo Bonito, North Cluster
IJP	Ida Jean Pueblo	PBW	Pueblo Bonito, West Cluster
PA	Pueblo A	OPB	Other Pueblo Bonito
DOMS	Domiciles	OGH	Other great house
AW	Aztec West		
SR	Salmon Ruin		
M41	Morris 41		

Fig. 9.1: Pueblo II age structures in San Juan Region rooms (a) and room floor (b) mortuary contexts, by age group and archaeological study unit.

Table 9.1: Distribution of all Pueblo II SJR individuals in a surface room MCT, by age group. Excludes Wallace Ruin.

	Infant	Child	Adolescent	Adol/Adult	Adult	Total
Fill	6	3	2		7	18
Floor	3	6	2		32	43
Subfloor	8	4	1		13	26
Indet. SR	3	11	5	26	9	54
Total	20	24	10	26	61	141

9.2.1.2 *Sex structure*

The MVR male: female proportion (2:3) suggests that there is no preference for males or females when considering all surface room MCT. This pattern holds in CCL great houses, including Pueblo Bonito's North and West Clusters. Of note, the North Cluster M:F sex ratio of 13:10 is essentially balanced. The MSJR sex structure is skewed towards females (1:4), but three M41 individuals have no diagnosis of sex. Regarding all surface room depositions, no SJR group numbering several mature skeletons is represented by one sex only. More females than males are in a room context, at a 35:54 proportion. However, the significance of this finding is suspect since the sex of 57 older adolescents or adults is unknown.

9.2.2 SURFACE ROOM FLOORS

9.2.1.1 *Age Structure*

From the information presented above in Figure 9.1b, it is evident that comparisons between PII populations are tenuous owing to very small sample sizes, apart from the remains from Pueblo Bonito's two Clusters. Yet, a few provisional statements are offered. First, the N-1 Two-Proportion Test result (p=0.001) confirms that the disproportionate number of SJR Adolescent-Adult (AO-A) individuals in a floor MCT accounts for the statistically meaningful skew in surface room age group representation. In fact, since both fill and subfloor age structures are equally balanced (9:9, 13:13), the only variant involves the very high prevalence (74%) of AO-A individuals in a floor context. The second, related, factor is that the only adults and older adolescents in a floor MCT are from Pueblo Bonito's Clusters and Pueblo del Arroyo, though the latter has just two. Although disturbances in both Clusters may have eliminated evidence of additional floor depositions, as it stands only adults are on North Cluster floors whereas infants, children, and at least one teen is in a West Cluster floor context. Also of note is that no Pueblo II group evidences a normal, or even somewhat typical, age structure involving floor depositions. Every one of the six remaining analytical units is represented by a single age class, usually just a single infant or child.

Other than Bonito's Cluster burials, Wallace has the most individuals in a floor context, though this involves just three or possibly four infants. The oldest is no more than a year old, and the other two are foetal/neonates. A fourth infant, less than six months old, is in disturbed fill of Room 15b but may have been in a floor MCT prior to disturbance. Yet, even though Wallace has comparatively more youngsters in a floor context, the number involved is insufficient to set this aspect of its mortuary program apart, especially when considering the various factors that can lead to the under-representation of infants in archaeological contexts. Rather, Wallace's age graded, infants-only mortality profile for floor use is consistent with the large majority of these sites, including Bonito's Other rooms. Altogether, the admittedly faint but pervasive SJR pattern in PII times is one in which room floors were construed as an appropriate mortuary location for youngsters only, with the notable exception of Pueblo Bonito's Clusters.

9.2.1.2 *Sex Structure*

No primary burial in an MVR or MSJR room floor context has a determination of sex. The four individuals from Wallace Ruin and Ida Jean Pueblo are too young for this assessment, and neither the age nor sex of the burial from 5MT2836 is reported. Most of the sexed Bonito individuals allocated to a specific room MCT are on a floor, except for the three males and one female in subfloor pits.

9.3 Pueblo III

9.3.1 SURFACE ROOMS

9.3.1.1 *Age Structure*

In total, age estimates are provided for 337 Pueblo III individuals from SJR surface rooms, in addition to those from Wallace. Most of the burial populations identified in Figure 9.2a are represented by several individuals, except for Ida Jean and Pueblo A. In short, those groups with many individuals tend to have age structures that, in broad terms, resemble the MVR comparative population. As an example, the occurrence of infants in the WR13 subgroup from Wallace is abnormally low; this group consists of 10 primary burials and Room 17's three iLinks. Yet, the WR28 subgroup mortality profile is much more typical; in addition to the WR13 subset, this group includes iLink 326 and 14 individuals represented either by an os coxae or mandibular dentition suitable for diagnosis of age (see Table 6.10, Section 6.3.4.2, for specific details).

The relatively normal appearance of most of these profiles is attributed to the comparative preponderance of subadults, in obvious contrast to the adult-dominated mortality profiles of Bonito's Clusters. As is documented in Table 9.2, all three room MCT categories are well-populated. Adolescent representation is low, but that is to be expected in terms of expected mortality for this age group and because of probable differences in age classification criteria. In contrast to PII results, the Fisher's *p*-value (0.249) signals that differences between the Infant-Child and Adolescent-Adult MCT distribution patterns are not statistically meaningful.

Table 9.2 : Distribution of Pueblo III SJR individuals in a surface room MCT, by age group. Excludes Wallace Ruin.

	Infant	Child	Adolescent	Adult	Total
Fill	48	41	6	43	138
Floor	16	19	13	25	73
Subfloor	26	25	12	63	126

9.3.1.2 *Sex Structure*

Approximately half (85/~160) of the Pueblo III individuals of sufficient skeletal development have a diagnosed sex; consequently, inferences are drawn with caution. Also, given the damage to the P3WR remains, and the potential for method and observation bias in the assessments of other researchers, the variation observed in any comparison is likely insignificant. Thus, the position here is that the anomalous low prevalence of Bonito's West Cluster males probably reflects methodological and archaeological factors rather than location choices based on an individual's sex. Still, when considering all surface room vertical proveniences, including those that are indeterminate, no SJR group with several mature skeletons is represented by one sex only. Instead, as can be seen in Table 9.3, all SJR groups have several members of each sex.

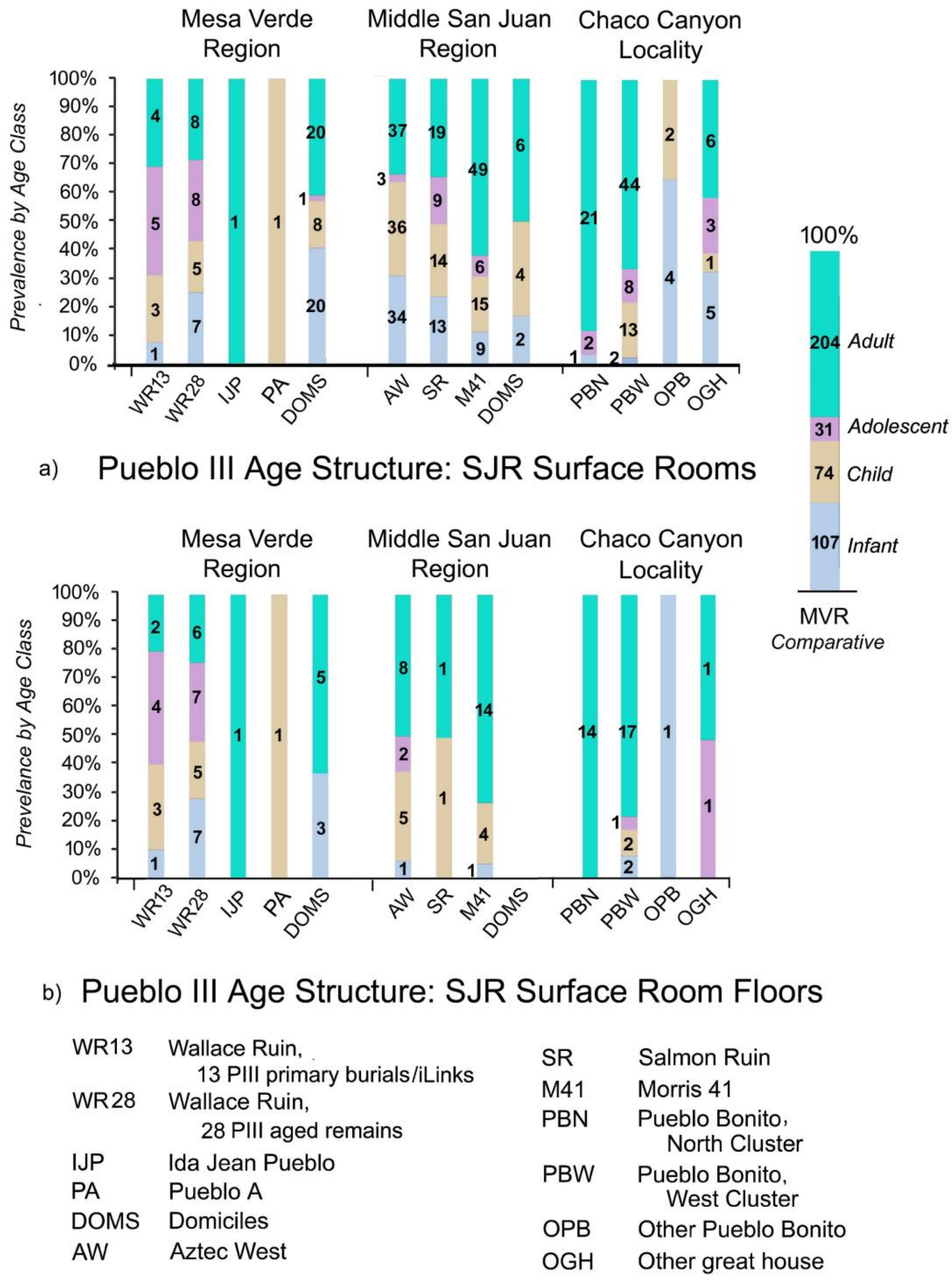


Fig. 9.2: Pueblo III age structures in San Juan Region rooms (a) and room floor (b) mortuary contexts, by age group and archaeological study unit.

As is the case for Wallace Ruin (62%, 60%), the MVR PII-III comparative population (N=203) is slightly skewed towards females (54%), when including individuals who are probably male and probably female. This proportion is a balanced 92:90 when including only those with a definite designation of sex. However, the accuracy of these MVR findings is uncertain since the sex of at least 60 suitable individuals is unknown. In respect to just the Pueblo III representations presented in Table 9.4, N-1 test results evidence no statistically meaningful differences in this proportional relationship for the MVR population used in this study, at a 95% confidence level. The lowest score obtained from data generated in this study is at the margin of meaningful result when confidence is 90%, but this test included only individuals of a determined sex. However, the addition of P3WR data from Wallace shifts this score well above a 90% confidence level, as does the consideration of individuals identified as probably male or female.

Table 9.3: The proportional representations of San Juan Region males and females in Pueblo III surface room mortuary contexts, compared to Pueblo II occurrences at Chaco Canyon.

			Pueblo II			***Pueblo III***	
MCT		CCL	PBN	PBW	WR28	MSJR	MVR
Room	M:F	32:47	13:10	14:34	5:8	24:31	10:7
	% M	41%	57%	29%	38%	44%	59%
Floor	M:F	11:21	8:6	1:15	4:6	3:3	2:1
	% M	34%	57%	6%	40%	50%	66%

CCL Chaco Canyon Locality; PBN Pueblo Bonito North; PBW Pueblo Bonito West;
WR28 28 aged P3WR individuals; MSJR Middle San Juan Region; MVR Mesa Verde Region

Table 9.4: Significance test results regarding the Male:Female proportion in the MVR comparative population versus this representation in various Pueblo III subgroups. Significant difference (*p* <0.05) in red.

	M/PM	M	F/PF	F	M/PM: F/PF	M:F
MVR Comparative, PII & PIII	97	92	106	90	0.372	0.834
Comp., Pueblo III	42	41	38	31	0.528	0.097
including WR28	48	46	47	39	0.885	0.284
WR28		5		8		0.249
NSJR/MVR[a] AD 1200-1299		39		22		0.002

M male, PM probable male, F female, PF probable female

[a] Kohler and Turner, 2006: Fig. 6

These results are thus inconsistent with the findings of Kohler and Turner (2006:1042), who attribute the disproportionately high number of NSJR males versus females (39:22) in Pueblo III times (AD 1200-1299) to the abduction of females during raiding. They do not provide specific details for MVR representation other than advising that this region contributes most of the data for NSJR sample. Nor do they describe the criteria used to identify these determinations, including whether determinations are inclusive of probable designations. Kohler and Turner (Ibid.:1038) emphasise that their study is a pilot project, in large measure due to inconsistent standards used by other scholars whose publications they relied upon, as well as small sample sizes. The N-1 test result for data provided in their publication indicates that the comparative infrequency of females is statistically significant. However, the larger sample size obtained for this study suggests that their identified dearth of Pueblo III females rather represents a non-representative sample.

9.3.2 SURFACE ROOM FLOORS

9.3.2.1 *Age Structure*

In total, 84 of the 87 SJR individuals in a Pueblo III floor context are suitable for an assessment of age. Only Wallace's WR28 subgroup and Aztec have profiles that are generally consistent with the MVR mortality trends. That said, Salmon's large PIII burial population has just one child and one young adult female in a floor MCT. Morris 41's somewhat better-populated age structure is most similar to the West Cluster's. However, rather than the deliberate age-graded scheme evidenced in the rooms of multi-storey buildings with intact ceilings, there is a good chance that differential preservation associated with deteriorated single-storey domiciles contribute to M41's low infant prevalence. Statistical analyses confirm that there is no Infant-Child v Adolescent-Adult age grading (Fisher's; *p*=0.312) regarding SJR burials on room floors. The differences in these proportions is not meaningful for the P3W13 subgroup (N-1; *p*=0.383) and definitely not for the nearly balanced WR28 group (N-1; *p*=0.779).

A significant finding is that there is no potential that the WR28 age structure equates to the North Cluster's, especially its Room 33. Assuming the reasonable possibility that many of the disturbed West Cluster remains were originally in a floor MCT, then the WR28 and Bonito's West Cluster surface room age structures are somewhat similar. Even so, the difference in Adolescent-Adult prevalence (52% v 78%) is still statistically meaningful (Fisher's; p=0.035) owing to the comparative infrequency of Wallace adults.

9.3.2.2 Sex Structure

Unfortunately, the appraisal of sex representation with respect to floor MCT prevalence is hampered by small sample sizes and the high number of burials of unknown sex, particularly regarding the West Cluster group. At any rate, all SJR groups are represented by males and females. The overall Pueblo III M:F proportion (9:10) is essentially balanced, as is the case for each SJR subgroup. Moreover, these distributions are similar to those of Pueblo Bonito's North Cluster, for which there is reliable demographic data. A significant finding is that the Fisher's Exact test result (p=1) means that there is no statistically significant difference in this proportion between the North Cluster and WR28 subgroups.

9.4. O' Pioneers?

As opposed to the residential demographic profiles evaluated in this analysis, the habitation locations of the P3WR individuals during life are unknown. The parsimonious interpretation is that they came from one or more MVR communities. However, even this assumption is open to debate. Morris 41 and the populated La Plata Valley are roughly 50 km (30 miles) distant, which is almost equidistant to the communities at south end of Sleeping Ute Mountain or the western precincts of the Montezuma County study area. Another possibility is that that, though MVR residents at the time of death, they were recent immigrants into the region. It is thus useful to compare their demographic profile to skeletal evidence associated with historic migrations, as portrayed in the historical novel *O Pioneers!* by Willa Cather (1913). Gill's (1994) bioarchaeological study of two 1800s pioneer groups of the American Plains provides such evidence.

As documented by Gill (1994; 160-162, Fig. 1), the pooled age-structure of Texas-Wyoming (T-W) individuals represented in Figure 9.3 is heavily weighted towards males (82.8%). Most of these men are in their 30s, with a few in their 20s and early 40s. Females of any age are rare (13.7%) as are neonates and infants (<12%). These data are consistent with the demographic profile of migrant/seasonal farmworkers in the US in recent years, in which males make up 79% of this population, and, as above, the majority are in their 30s. This information suggests an economic basis for the T-W pioneers.

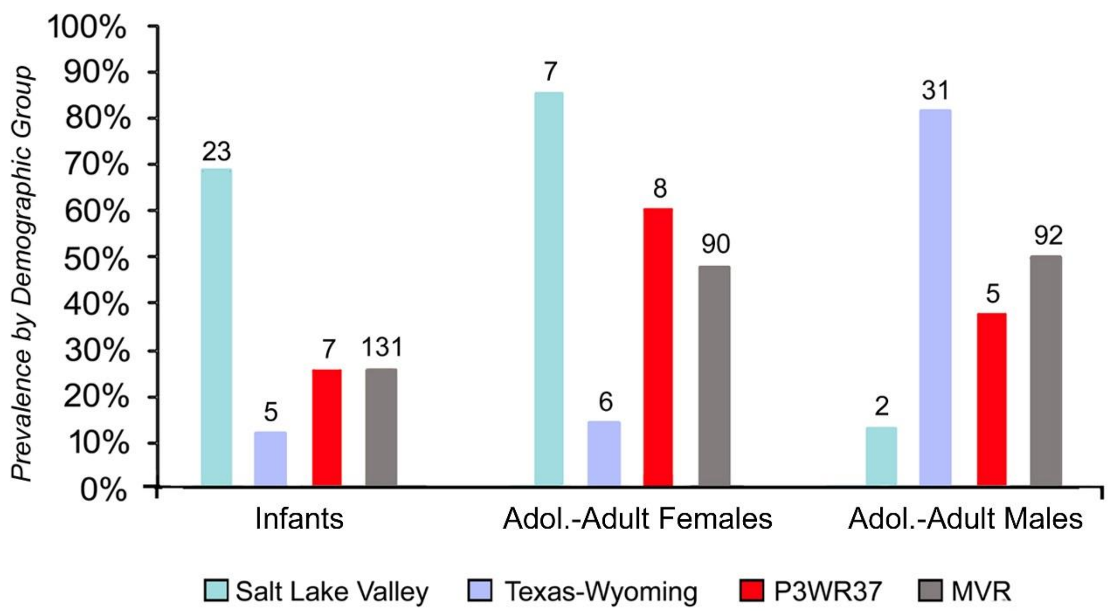


Fig. 9.3: Comparison of key demographic variables of US historic pioneer groups versus Pueblo III burials from Wallace Ruin and the MVR comparative population.

On the other hand, two-thirds of the 33 burials from the Salt Lake Valley group are less than two years of age, most of whom are neonates. Nearly nine out of 10 (87.9%) of the adults are females. This group is associated with the movement into Utah by Mormon settlers as they sought to escape religious persecution, though economic considerations were also in play (Stegner, 1992). Whether the demographic profile of this small cemetery was representative of the local Mormon community is unknown. Many of these immigrants moved as family units though entire communities relocated as well. In the latter instance especially, immigrants would have certainly included Mature Adult and Old Adult males and females. The degree of high infant and maternal mortality may be, to some extent, associated with the (then) Mormon practice of polygamy and the extreme religious emphasis on human reproduction. Ancestral Puebloans might not have so accentuated such practices and considerations.

It is thus evident that both pioneer profiles are significantly skewed in terms of age and sex, and therefore completely different to the WR28 demographic evidence. Although the aged adult males at Wallace Ruin are in their 30s, the presence of a high proportion of adult and older adolescent females is inconsistent with the demography associated with economic migrations. The presence of six WR28 females potentially of child-bearing age could be related to childbirth mortality, as in the Salt Lake Valley group. Yet, the absence of neonates suggests otherwise. The variation from either pioneer demographic profile does not rule out the possibility that Wallace's Pueblo III individuals were members of an immigrant group, but the evidence does not support such an interpretation.

9.4 Conclusions

The results of this limited analysis of age and sex evidence associated with room and floor mortuary contexts provide reasonably strong answers for questions asks at the beginning of the chapter. Pueblo Bonito's Cluster burials are distinct in terms of adult-skewed age grading, but the sex ratios are balanced. The infant-skewed mortality profile for Pueblo II burials at Wallace is slightly unusual only in respect to its slightly above-average number of infants. It is important to note that preservation and excavation expertise can affect prevalence determinations for individuals of this age disproportionately, so a matter of a few more, or less, infants is not of interpretive significance. Rather, focus is best placed on the absence of room MCT involving older individuals at Wallace and other well-populated Pueblo III burial populations. Another important finding is that WR28 demography is generally similar to the MVR comparative population's in terms of room use but only akin to Aztec in respect to floor deposition. Its divergences from the MVR/Latin American expected mortality pattern can be readily explained by the small sample size and the taphonomic consequences of the disturbance of primary burial deposits by carnivores. The Ida

Jean and Pueblo A burials, with one each, are simply too scant to provide any interpretive insights.

All in all, the demography of Wallace's PIII population definitely does not suggest that mortuary decisions for deposit were influenced by the deceased's age, sex or combination thereof. Instead, the patterns are more in keeping with that of an established residential community. This is not to say that these dead were necessarily members of the same household or even an extended family. Despite resonances with a typical MVR mortality profile, the possibility that they were nevertheless associated with a house society based on prior Chacoan connections or precepts is addressed in Chapter 12.

CHAPTER 10

WALLACE RUIN VARIANT: POSTURAL ARRANGEMENT

10.1 Introduction

The marked preference for the postural arrangement in Wallace's Pueblo III (P3WR) depositions, in which the vertically oriented knees of the corpse were semi-flexed at an approximate 40 degree angle and the torso supine, poses several questions. Foremost, does this upright knees (USF/S) configuration represent aspects of a mortuary community of practice that is unique to Wallace, or, has it been identified in other SJR sites? In view of the notion that the Pueblo III re-use of Wallace entails the resurgence, or adopting, of Chacoan house society characteristics, how does this P3WR pattern equate to postural arrangement in Bonito's burial clusters? Also, are there other instances in which the described arrangement reflects the discovered postural arrangement rather than the original configuration? Accordingly, the purpose of this chapter is to present evidence regarding postural arrangement trends at other SJR sites. The results will demonstrate that the USF/S postural arrangement is very anomalous concerning floor depositions at Wallace; in turn, this means that they are also distinct from the pervasive SJR flexed/lateral arrangement. Another crucial point is that this posture is different to the extended skeletal configurations observed in Pueblo Bonito's Clusters, which although are not unique, are noteworthy in terms of prevalence, age groups and surface room MCT occurrence.

10.1.1 APPROACH

This evaluation of SJR postural arrangement trends makes use of photographic evidence, when available, to perform retrospective analyses of lower limb arrangements in individuals in both supine and lateral positions. However, most of these determinations rely upon descriptions provided by other researchers since photographs of *in situ* remains are infrequently provided, as is the case for Karhu's (2000) monograph on the numerous burials from 5MT3. This is especially the case for the MVR evidence, where most field photographs involve remains located in extramural middens (see Cattanach, 1980; O'Bryan, 1950; Rohn,1971).

Unfortunately, these accounts frequently omit specific details about lower limb postural arrangements, so is not possible to ascertain the extent of flexure. Therefore, ordinarily, such arrangements are subsumed under the single category *flexed.*

On the chance that researchers were unduly influenced by lower limb configuration at discovery rather than the presentation of the torso, the possibility that upright knees/supine postural arrangements were misidentified must be considered. Accordingly, all available photographs and maps were evaluated in terms of equivalence of the scholarly description to observable torso positioning and lower limb configuration, regardless of mortuary context type. Key resources comprise: Cattanach (1980); Hayes and Lancaster (1975); Judd (1954); O'Bryan (1950); Lister and Breternitz (1968); Lister and Smith (1968); Martin and colleagues (2001); Morris (1924); Reed (1979); Rohn (1971); and Swannack (1969). A significant point is that the very good correspondence between text and graphics gives a solid basis for concluding that reported flexure determinations in terms of lateral versus supine positions are highly credible even when there is no supporting documentation. This process also upholds the reliability of accounts which omit descriptions of skeletons as being in an upright knees arrangement. Thus, even though Morris provides no detailed maps or photographs for Morris 41 (1939), the accuracy of his descriptions can be assumed based on the close correspondence of his mortuary context descriptions with the many field photographs provided in his earlier (1924) monograph on the burials from Aztec West.

That said, there are a very few cases in which it not certain whether knees described as "to the side" or pushed to a side were actually upright at deposit. For example, Morris (1939:87) describes subfloor Burial 30/4 of Morris 41 as "Adult male, on back, head to north. Lower legs formed angle of about 60° with femora, which were mashed down to the right at an angle of 120° to trunk. Arms by side, with hands over groin." Based on the likelihood that he measured limb configurations in terms of interior angles, as advanced by Ubelaker (1989), the knees projected inferiorly with legs under thighs. There is no photograph or map, but this description closely matches the configuration of HR 15 of Wallace Ruin (see Fig. B.27), except that his knees align with midline. Alternatively, if measured in terms of Range of Motion, then Burial 30/4's thighs were flexed, tightly if not fully, on the torso. Thus, by either method, an upright knees posture can be eliminated. The absence of photographic documentation means that it is not possible to evaluate whether the limbs shifted laterally subsequent to deposit. However, since the typical micro-environment of an Ancestral Pueblo subfloor pit involves a filled space, it is reasonable to assume that their lateral "mashed" orientation reflects their depositional arrangement.

10.2 San Juan Region: Pueblo II

10.2.1 MESA VERDE REGION

The large majority (74/87; 85%) of MVR primary burials from any Pueblo II MCT are in a flexed posture, regardless of age or sex. Judging from the documentation that is available, most are positioned on the side, with lower limb configurations ranging from loosely to fully flexed. Only 10 individuals are in an extended position, including several infants. The only individual described as possibly in an upright knees posture is an adult male interred within the Site 5MT9847 midden (Hungerford et al., 2002b).

Fewer than 20 individuals are in a surface room context of any type, and none is in a USF/S or an extended postural arrangement. All but two or three are in a flexed/lateral posture, including the three infants from Wallace and the three children from Ida Jean. The postural arrangement of the individual located on a 5MT2836 floor is unknown. Of note, the richly accompanied, possibly high status adult female (Reed, 1979:130) on a room floor at Dominguez Ruin (5MT2148), a small domicile near the Chacoan great house of Escalante Ruin, is flexed and on her right side.

10.2.2 MIDDLE SAN JUAN REGION

In contrast to the MVR evidence that is predominantly associated with domicile middens, most of the MSJR individuals are located within great house rooms. Although the total number of assessable Pueblo II remains in a room MCT is scant, a flexed/lateral arrangement is also the most common configuration in MSJR sites. These occur in 78% (7/9) of the assessable remains, and each is in a subfloor MCT. Burial 30/107 of Morris 41 is one of the two exceptions. The knees of this supine adult female are “elevated” to an undescribed degree (Morris, 1939:101); she may be on a use surface but the ambiguous description also allows for deposition within room fill. The ninth individual is extended/prone and is within room fill at Salmon Ruin; whether this represents the deposition versus discovered microenvironment cannot be ascertained from the description provided (Espinosa, 2006:345). No information is available for the other five individuals in a room MCT.

10.2.3 PUEBLO BONITO

The previously described Burial 23 (Fig. 5.3, Section 5.2.7.1), who was interred in a filled subfloor pit of Room 330 (Judd, 1954:333), is the only individual in an upright knees posture at discovery. In distinct contrast to SJR practices, the large majority of Pueblo Bonito (69%) individuals are in an extended postural arrangement. All 20 are on a North or West Cluster floor or indeterminate fill/floor mortuary context. It is also noteworthy that every one of these is an adult or older adolescent. In contrast, six West Cluster children are flexed or fully flexed as are three infants deposited in other Pueblo Bonito rooms. Put another way, an extended position is also specific to Cluster depositions. Half are extended/supine, a pattern which just by itself is five times more common than either the akimbo/supine or flexed/lateral configurations. Moreover, two of the three individuals with akimbo lower limbs may be interpreted as extended; their feet were either against (Pepper, 1909:223) or close to (Judd, 1954: Pl. 95) a wall, suggesting an attempt to deposit a corpse with a space insufficient to accommodate a fully extended body. However, the akimbo configuration of the lower limbs of Burial 10 of Room 330 was intended to accommodate the arrangement of 28 arrowheads within a triangular pattern between the knees (see Fig 8.6). No observed skeleton in a subfloor locus is extended; however, those in Room 56 that were collected or disturbed by Moorehead may have been since each pit’s dimensions could accommodate a fully extended adult corpse (Pepper, 1920:217).

10.3 San Juan Region: Pueblo III

Table 10.1 presents the range of postural arrangements observed in primary burials from Pueblo Bonito and the Pueblo III results for Wallace Ruin, MVR and MSJR sites. In this analysis, these variables consist of the arrangement of the lower limbs relative to the positioning of the torso. The sums in bold represent the most prevalent positioning variables per archaeological region. Of note, due to post-deposition disturbances or inadequate descriptions, these results represent less than half of the total number of mortuary deposits identified. Prevalence determinations for the predominant lower limb configuration per study unit are displayed in Figure 10.1, excluding the akimbo postural arrangement.

Table 10.1: Distribution of lower limb/torso postural arrangements among suitable San Juan Region individuals in a surface room mortuary context, by site or region.

L Limbs/Torso	Wallace Ruin Pueblo III	P. Bonito Clusters, Pueblo II	MVR all	MSJR all
upright knees/supine	**5**	1		1
akimbo/supine		3		
extended/supine		**15**	3	6
extended/lateral		1		
extended/prone		2		
extended/?		2	3	
flexed/supine	2	2	8	14
flexed/lateral	3	3	**15**	**85**
flexed/prone			5	3
flexed/?			5	
unknown	<18>	<63>	<17>	<104>
Total suitable	10	29	39	109

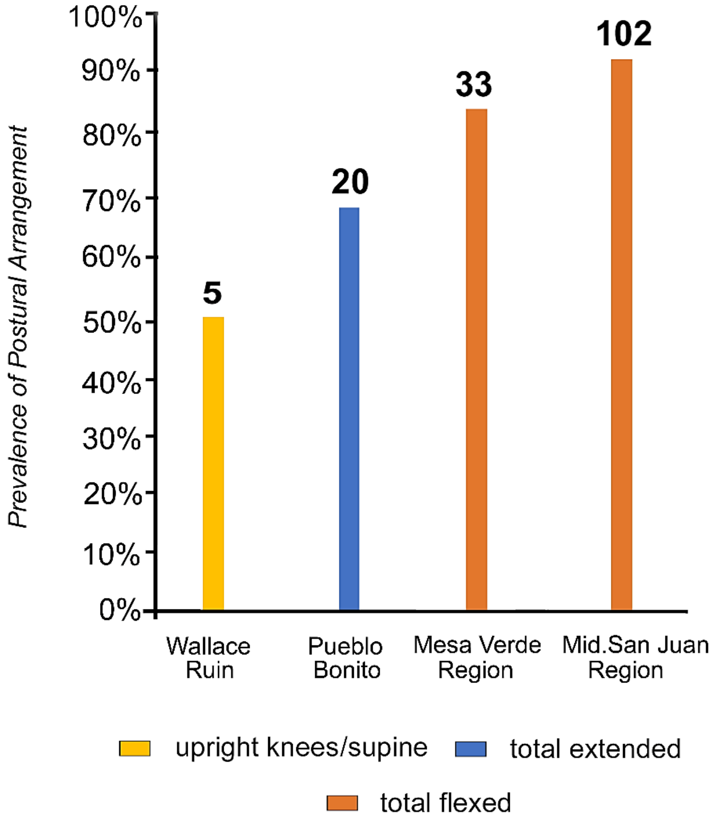


Fig. 10.1: Occurrence of lower limb/torso postural arrangements in San Juan Region individuals in a surface room MCT by site or group.

10.3.1 MESA VERDE REGION

No individual from an MVR domicile or the Ida Jean Pueblo and Pueblo A great houses is in an upright semi-flexed/supine configuration. The IJP adult is semi-flexed and unquestionably presents laterally. Dove and colleagues (1997) describe the child on the floor of Room 15 of Pueblo A as on the side and flexed. Two 5MV34 individuals are flexed/supine, including one burial (B25) in a floor MCT. His flexed limbs are oriented to the right, but whether this was the case at deposit is unknown.

As in Pueblo II times, the PIII flexed/lateral pattern is pervasive, constituting more than one-third of the suitable skeletons. When including all torso positions, some 85 percent have flexed lower limbs, or above five times the total prevalence of extended postural arrangements. Six of the eight extended burials are infants in a fill or subfloor MCT.

10.3.2 MIDDLE SAN JUAN REGION

A flexed/lateral body position is again pervasive among surface room depositions in MSJR sites during post-Chacoan times, constituting some three-quarters of the assessable skeletons and 94 percent of the individuals independent of torso position. Of the seven extended/ supine individuals, six are infants or young children. One or two of these are, apparently, associated with cradleboards.

Only one (<1%) supine MSJR individual has flexed knees that are unequivocally upright, though there may have two or three. The configuration in which lower limbs are flexed tightly on the supine torso appears to be more common. Morris (1924:203) describes an Aztec West skeleton in a compact subfloor pit as "Adult; female of about thirty years, lying on back with head to the east in a pit beneath the secondary floor in the south-west corner, 30 inches deep, 31 inches long, and 17 inches wide. The knees were elevated at right angles to the trunk; the feet were rotated inward and crowded between the buttocks and the west wall. Comparison of this passage to the very grainy image in his field photograph (Ibid.: Fig. 19, upper right) confirms the accuracy of his description; unfortunately photograph resolution quality prohibits evaluation of bone displacement evidence.

10.4 Conclusions

The results of these analyses support previous findings regarding the ubiquity of flexed postural arrangement in SJR regions, with the notable exception of the extended burials concentrated in Pueblo Bonito's Clusters. This study also provides credible evidence for the unusual occurrence of an upright, semi-flexed knees posture at Wallace, both in terms of high prevalence and mortuary location on a surface room floor. Though Wallace's HR 5 is tallied as flexed/supine, her knees may also have been upright initially. By this adjusted 60 percent prevalence, every assessable P3WR floor deposition (excepting infant HR 2) is in the USF/S arrangement. In contrast, this rarely observed, or potential, arrangement in other sites involves individuals within fill or in a subfloor locus, with just one potential floor deposition with upright knees at Aztec West and potentially, an individual from 5MV34. Even when allowing for the potential that USF/S postures were misidentified by other researchers, clearly no pattern emerges in which more than one or so bodies per site, if that, were so arranged. Thus, this corpse configuration for room floor deposits at Wallace is distinctive to all other great house and domicile groups, including the admittedly scant burials from the Ida Jean and Pueblo A great houses. On the other hand, the three Wallace subfloor deposits are flexed/lateral or flexed/supine, which is consistent with configurations observed in MSJR and CCL sites. Another difference pertaining to MVR great houses is that no extended primary burials are reported at either of the two assessed Lakeview Group great houses, nor at Pueblo A, from any time.

That the postural arrangement of numerous individuals is unknown raises questions about the efficacy of advanced statistical analyses. For example, whether the upright knees position was adopted for Wallace's numerous disturbed burials is indeterminate. Other sources of uncertainty include the depositional status of the postural arrangements of SJR supine skeletons with flexed lower limbs, and the inability to assess the infants who constitute substantial proportions of the MVR and MSJR burial populations.

Yet, setting these concerns aside, N-1 results provided in Table 10.2 for these proportions confirm that the differences in the USF/S posture at Wallace and the extended/supine arrangements at Pueblo Bonito are statistically meaningful relative to each other and to patterns observed in MVR and MSJR groups. At the same time, the PBC and MVR/MSJR assays demonstrate that they are not significantly different to each other in terms of the dearth of USF/S arrangements. The similar condition applies to extended posture arrangement of individuals from Pueblo Bonito's two Clusters, except that it is Wallace that shares the near-absence of a configuration with the MVR/MSJR groups. The presence of a few lateral/flexed individuals at Wallace is not distinctly different from MVR trends. The highly significant difference to the MSJR's flexed/lateral (FLX/L) proportion pertains to the near exclusion of other postural arrangements in that study unit. It is also worth mentioning that the scale of this preference is such that the proportional difference to the MVR FLX/L pattern is also statistically meaningful at the 90% confidence interval.

Table 10.2: *P* -values regarding differences in the most common postural arrangement for Wallace, Pueblo Bonito Cluster, MVR and MSJR individuals in a surface room context, by study unit. Significant difference (red) when p <0.05.

	Fishers's Exact Test	***N-1 Two-Proportion Test***		
Variables	(2x3)	USF/S	EXT/S	FLX/L
WR v PBC	<0.001	<0.001	0.004	0.142
WR v MVR	<0.001	0	0.597	0.624
WR v MSJR	<0.000	0	0.110	<0.001
PBC v MVR	<0.000	0.417	0.001	0
PBC v MSJR	<0.000	0.311	0	0
MVR v MSJR	0.092	1	0.053	0.090

USF/S upright, semi-flexed/supine; EXT/S extended/supine; FLX/L flexed/lateral

The rationale for a marked emphasis on extended burial posture in the North and West Clusters of Pueblo Bonito is unknown. In his assessment of mortuary evidence from the greater Southwest, Stanislawski (1963:313) finds scant evidence of this postural arrangement prior to AD 1000, with the greatest Ancestral Pueblo concentration occurring at Pueblo Bonito, which he describes as a Chacoan trait. Reyman (1978) hypothesises that Burials 13 and 14 of Pueblo Bonito (Pepper, 1909) and the Magician's Burial at Ridge Ruin (McGregor, 1943) are high-status *pochteca* (traders/expansionist agents) from Mesoamerica. He cites the eye-witness account of the Spanish missionary priest Sahagún (1959:25) regarding the mortuary treatment of an Aztec *pochteca*. In that instance, the body was adorned, lashed to a carrying frame, transported to a mountain-top, and the frame then leaned against a post so that his "body was consumed. And they said that he had not died, for he has gone to heaven; he followed the sun." McGuire (1980) refutes this argument by noting that this description is not replicated at Pueblo Bonito, other than that both individuals are richly accompanied and in extended arrangements.

Other evidence situates extended posture to times prior to the expression of the Chaco regional system in the mid-1000s. For example, Stodder (1987) identifies several Pueblo I extended burials in the Dolores Locality, and Hayes and Lancaster (1975:174, Fig. 225) report one at 5MV1676 on Mesa Verde. Even stronger evidence is provided by recent AMS results for Pueblo Bonito's Room 33, which dates the earliest of its assessed extended burials to the late AD 800s-early 900s. Although

Marden (2011:362) offers no interpretation regarding the emphasis on this postural arrangement in Room 33 depositions, she also make the salient point that these dates undermine interpretations of a Chaco Phenomenon three-tier hierarchy, which are largely based on North Cluster mortuary evidence. Although this configuration was employed, on occasion, in the MVR prior to the massive migrations to the Chaco core area in the Late Pueblo II, other immigrants came from Chuska Slope communities situated near the current Arizona-New Mexico border (Wilshusen and Van Dyke, 2005). To consider all historic contingencies requires research beyond the parameters of this study.

Considering the rare occurrence of the USF/S postural arrangement, it is not surprising that this configuration has not been afforded a similar treatment in studies of Ancestral Pueblo corpse arrangement. Potential symbolic associations are also beyond the scope of this study, however, there is credible evidence that it is not derived from any historical precedent associated with Pueblo II or Pueblo III great houses and domiciles of the MVR and MSJR. Ostensibly, it does not draw upon the community of practice regarding mortuary treatment choices in Pueblo Bonito's Clusters. However, this may not be as it seems. Discussion of the possible associations of these two postural arrangements with Chacoan house society rituals, including the potential that the upright knees postural arrangement at Wallace may have been predicated on the Pueblo Bonito pattern, is addressed in Chapter 11.

CHAPTER 11

INTENTIONAL HUMAN DISTURBANCES

11.1 Introduction

The disposal of the corpse is the first mortuary behaviour, but not necessarily the last. Subsequent post-depositional interactions can involve the manipulation of the corpse within the mortuary context, producing subtle or patterned displacements (Nilsson Stutz, 2003). Based on the comprehensive review of the literature undertaken in this study, the over-arching pattern of MVR mortuary behaviour is one in which physical interaction with the corpse does not occur after disposal. This is not to say that post-depositional rites were not performed; only that there is no evidence to suggest that such actions involved the intentional displacement, relocation, or retrieval of bones. The evidence presented in the four previous chapters provides strong grounds to conclude that the Pueblo III mortuary use of the Wallace great house represents a minority rite related to a house society concept. However, does it follow that this explanation also applies to the deliberate intrusions into the mortuary contexts of two Wallace Ruin individuals? Or, is there evidence for an alternative explanation, such as depredations by prehistoric enemies or historic looters? Thus, the purpose of this chapter is to present the evidence used to interpret these events in respect to house society reformulation at this former Chacoan great house.

11.2 Setting the scene

The Figure 11.1 plan of the southwest corner of the great house documents the locations of the two intrusions into the West Arm and the status of relevant passageways by the time of these incursions. Each of these entryways was already plugged (walled-in) or blocked by structure collapse. For reasons provided in Section 6.4.2.2, the determination is that the exterior, T-shaped doorway in Room 26a was plugged after the carnivore intrusion. As a result, Room 27a was no longer accessible from the ground-storey. The single upper-storey hatchway in the South Suite was blocked by construction materials, and the only exterior upper-storey entrance in Room 19b was plugged, possibly blocked by the adjacent Pueblo II kiva.

The “punched-through” hole in the south wall of 27a was not repaired after the intrusion, as is evidenced by the lack of wall stones within the sediments that subsequently filled the opening and the development of a deep layer of laminated fill (Strat 6) above Strat 7. It is thus far-fetched to infer that the deliberate plugging of the 26a and 19b doorways was the work of the intruder(s) after the disturbance of HR 11. The common-sense arguments are that intruders would have made use of open passageways rather than expend considerable effort to create large “punched-through holes” within compound masonry. This construction technique, which produces a “double-thick” wall, entails overlapping interior and exterior sandstone slabs to create an internal bonding, with any gaps in the interior space filled with mortar and chinking stones (Lekson, 1984:21).

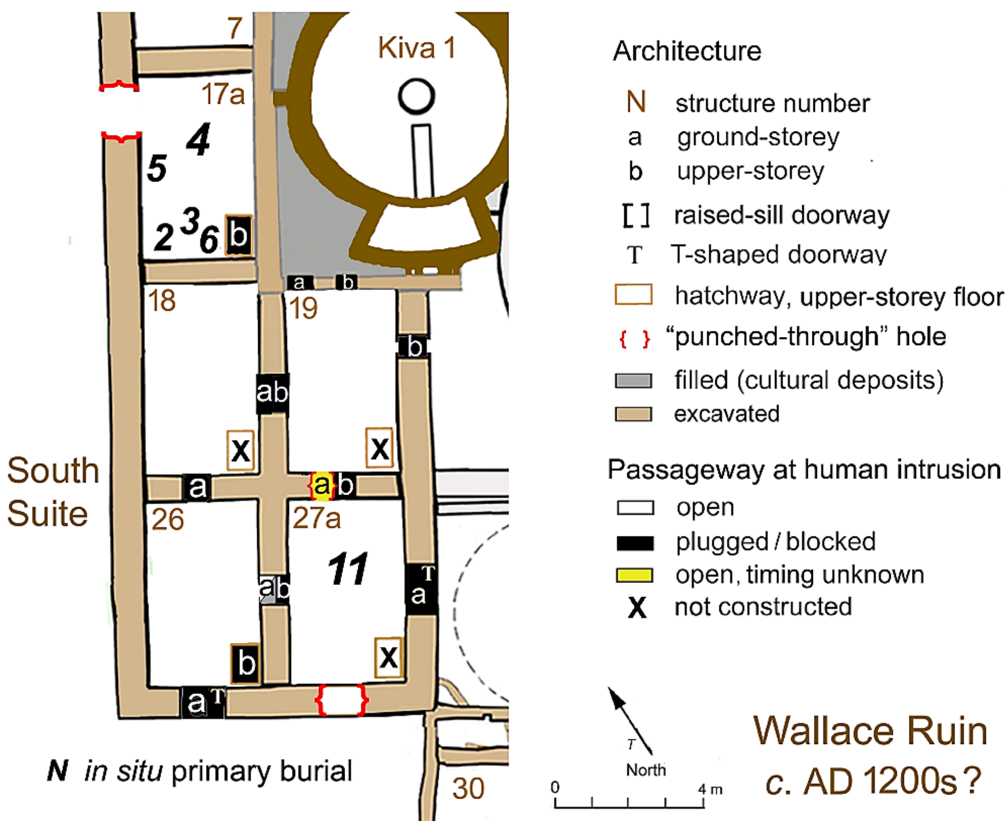


Fig.11.1: Plan showing locations of “punched-through” holes created for the human intrusions into Rooms 17a and 27a of the West Arm. This map also documents the status of the constructed passageways at intrusions.

Estimation of the PMI (post-mortem interval) regarding the intentional disturbance of HR 11 and HR 4 makes use of stratigraphic data provided in Appendix A and taphonomic evidence presented in Appendix D. Summaries of the points relevant to this evaluation of the interval between deposit and disturbance are provided below, but skeletal evidence indicates that both intrusions transpired well after primary deposition between AD 1180-1220, during Stage 5 decomposition. The intrusion into Room 17a occurred after the collapse of the burned upper storey floor (Surf 1), but entry into 27a occurred prior to structure collapse. The rationales for a determination of intrusions during prehistoric times are provided at the end of this section since similar arguments apply.

11.3 HR 4

11.3.1 STRATIGRAPHIC EVIDENCE

Although the intrusion into Room 17a was limited in scope, it involved numerous strata in a room already having a complicated stratigraphic sequence. The reader is thus referred to the three figures in this and the two sections that follow. The Figure 11.2 field photograph provides an oblique view of the mortuary context and strata affected by the intentional human incursion. The Figure 11.3 plan of the northwest quadrant of 17a provides supplementary details regarding the area of intrusion and other disturbances within the vicinity of HR 4. In addition, Figure 11.4 comprises a field photograph of the “punched-through” hole in the exterior west wall that is juxtaposed with a stratigraphic profile of this quadrant. Of note, the (inferred) 17b/17a hatchway provided the only built entry into Room 17a.

11.3.1.1 *Primary burial deposit context*

In brief, the adult male HR 4 was deposited on his back upon Surface 2, the upper of the two Pueblo III floors in the central-west region of Room 17a. A gradual, natural accumulation of silty fill (Stratum 6) covered the feet, lower torso, arms and, presumably, the upper torso and head of HR 4. The depth of this deposit in relation to HR 4 is uncertain, but, as is observable in Figures 11.2 and 11.3, coverage was sufficient to hold forearm bones in anatomic position despite the removal of the right humerus and the complete fracture of the left humerus. In the field photograph, HR 4’s knees rest just above Surface 2; however, as discussed in ~~the~~ Chapter 6, they were upright at deposit (see also Appendix B).

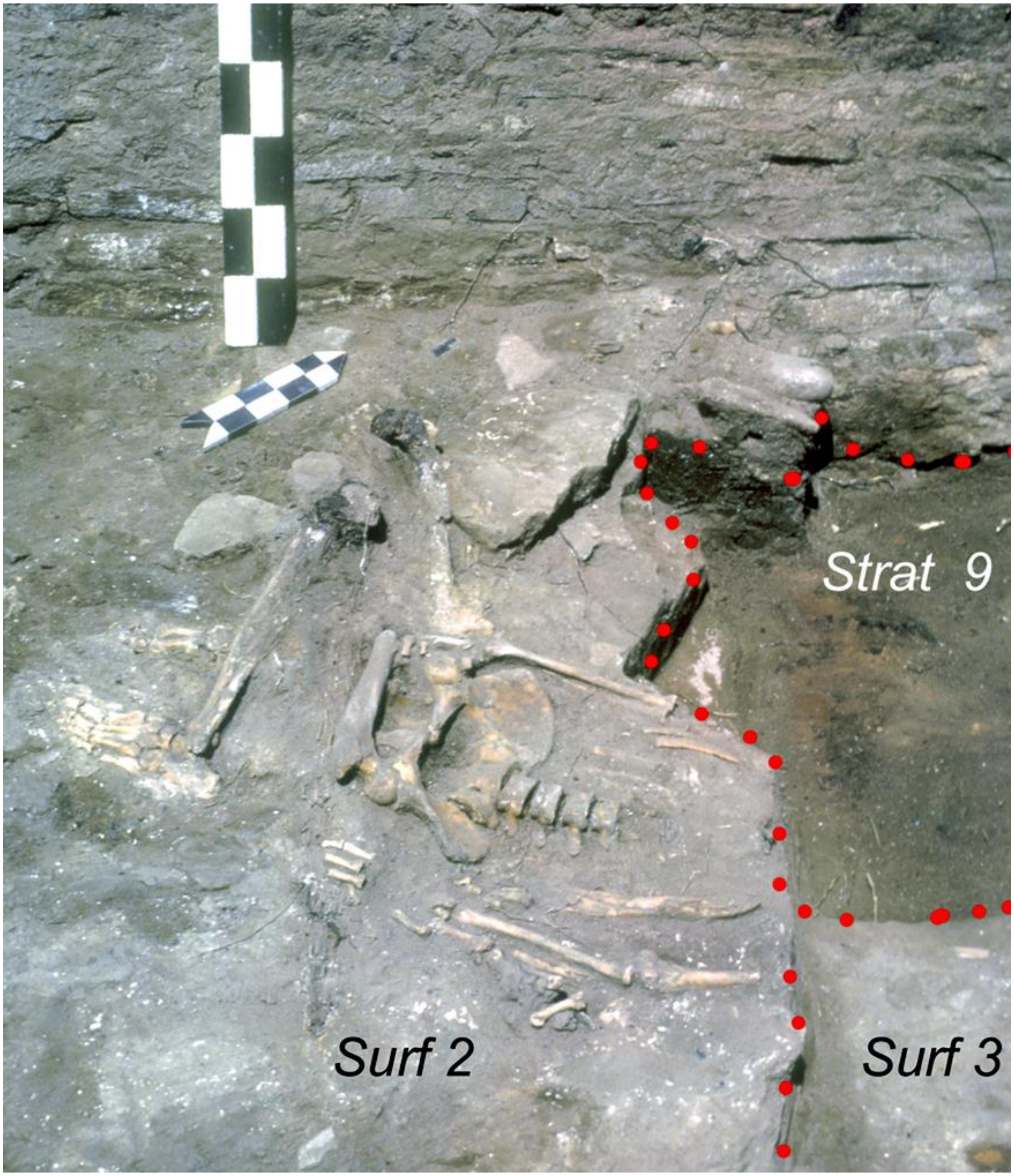


Fig. 11.2: Field photograph of HR 4 skeletal elements on the mortuary disposal surface, the proveniences disturbed by the human intrusion into the northwest corner of Room 17a, and the excellent preservation of an undisturbed section of the exterior west wall.

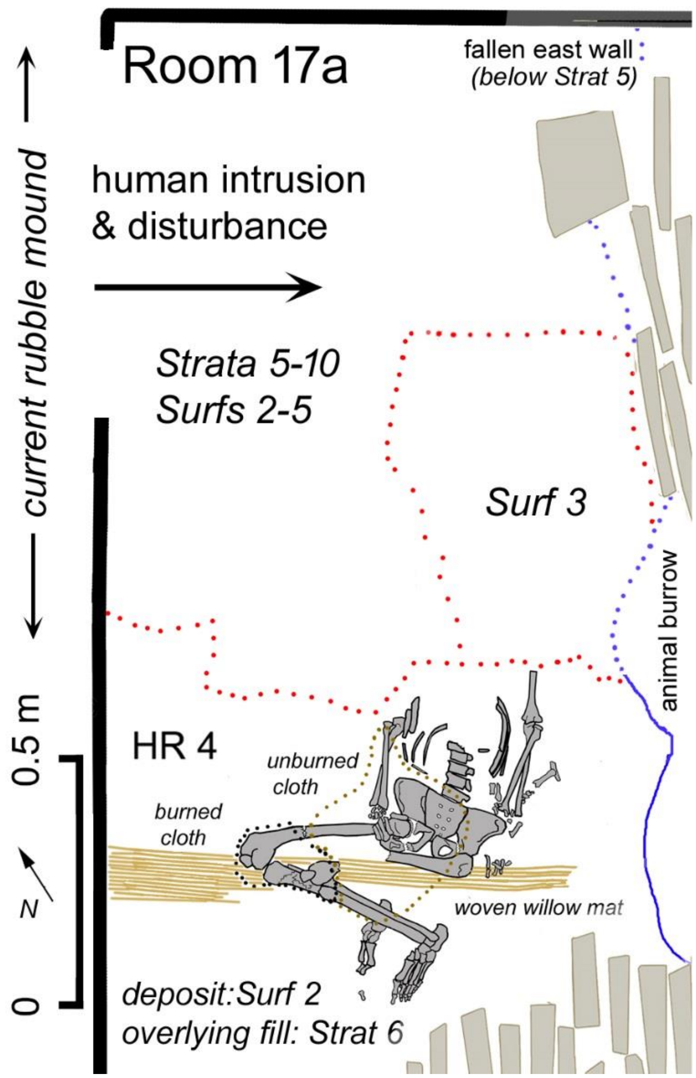


Fig. 11.3: Plan of the northwest quadrant of Room 17a, depicting the positions of HR 4 skeletal elements as discovered relative to intentional and natural site formation processes. Zones of human disturbance are outlined in red.

Prior to intrusion, an intense fire in Room 17b burned the upper-storey floor (Surface 1) and probably the STR 17 roof as well. During that conflagration, Surface 1 wood was charred and the thick level of sandy-clay flooring materials (Stratum 5) were burned and oxidized. This fire resulted in the collapse of the northern two-thirds of 17b's burning Surf 1 beams and flooring materials (Stratum 5) onto to Stratum 6 and the exposed distal femora, knees, and superior legs of HR 4. Cotton shrouding and exposed bone surfaces above the level of Stratum 6 were charred, the latter in a circumferential pattern, and the lower limbs were pushed downwards and to the right in their photographed location. Judging from the survival of the charred cloth, floor adobe soon smothered these flaming materials. Though cloth within both knee regions was charred, unburned sections were observed, though not recovered, over much of the lower limbs, pelvis and right forearm. Their undamaged state means that they were overlain by sediments and thus buffered from heat exposure prior to collapse of burning Surface 1, Room 17b materials. Hence, retained articulations and anatomic relationships and the state of most of the organic materials indicate that these regions of the skeleton were covered by sediments prior to this structure collapse episode.

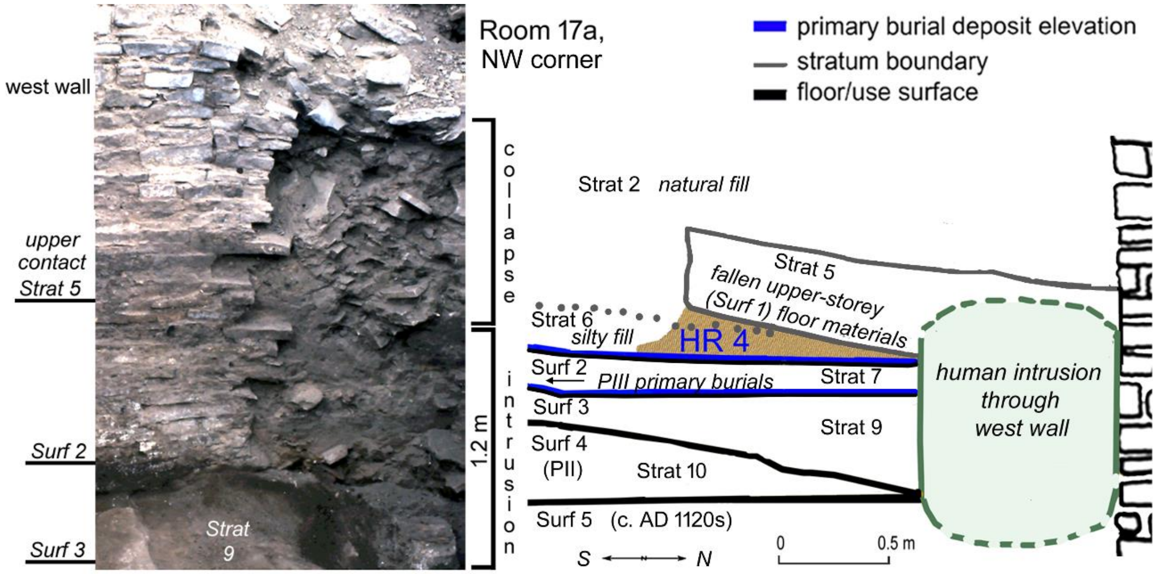


Fig 11.4: Photograph and profile map regarding the human intrusion through the exterior west wall of Room 17a. The relevant site formation processes concerning the mortuary context of HR 4 are highlighted: deposit on Surf 2, partial coverage by natural accumulations, the development of structure collapse strata, and the subsequent intentional disturbance.

At some point, the east wall collapsed as a unit onto Strat 6 (Surf 3 in some parts of 17a); the blackened and orange colouration of many stones indicates oxidation from exposure to intense heat. Although contiguous sections of fallen wall bracket HR 4, no sizeable stones or sections landed directly above his remains or nearby. Possibly, the configuration of several stones just east of HR 4 indicates a fallen upper-storey doorway, which, if not plugged, could explain the paucity of stones in that area. This wall collapse may be related to the structure fire in Room 17b. Natural fill (Strat 2) and wall collapse eventually filled all of Room 17a and the lower level of 17b.

11.3.1.2 *Intrusion*

The human intrusion into Room 17a occurred after the collapse of the burned upper-storey floor (Stratum 5) onto Stratum 6 of 17a. The depth of structure strata above this stratum at the time of entry is unknown. In addition to the difficulty in digging through burned flooring materials with digging sticks or adzes, a thick layer of natural fill (Stratum 2) or additional wall fall (Stratum 1) may have discouraged intrusion from above, if the upper-storey of the West Arm was even accessible. Entry occurred near the base of the building at or about prehistoric ground surface, based on the elevation of the lower margin of the intrusion from within 17a. Currently, the entire length of the west wall of the great house is bounded by a very large and deep accumulation of sandstone masonry produced during the collapse of upper-storey walls. Although this pile is unexcavated, its consistent shape and configuration signal that it is undisturbed.

The intruders created a large, roughly 80 cm wide by 120 cm high opening by removing wall stones from the bottom of the compound (double-width), exterior west wall in the northwest corner of Room 17a. As illustrated in Figure 11.4 above, this opening extended from a point below the original ground-storey floor (Surface 5) up through the lower half of Stratum 5. The area of intrusion within the wall is filled with sediment and an occasional piece of sandstone masonry. This contrasts to the jumbled masonry immediately above which slumped following the removal of the underlying wall stones. No stones along the intrusion perimeter or within Room 17a evidence damage consistent with the use of metal tools.

Only the northwest quadrant of 17a was disturbed by humans; a large area along the eastern side of the room was heavily disturbed by animal burrowing. The generally vertical margins of the intruded area are quite distinct in the northwest corner of the room; the region of intrusion is less distinct but still readily discernible immediately north of the *in situ* remains of HR 4, where only Surface 2 and Stratum 7 fill were removed to the Surface 3 deposition level. No shovel or pick scars were observed along any margin associated with this intrusion. It is evident that entry into 17a involved tunnelling eastward through a meter or so of floor and fill units since the upper contact of Stratum 5 was not penetrated at any point. The timing of the accumulation of Stratum 2 fill is unknown in relation to this event, but this natural fill stratum is undisturbed in the area adjacent to the slumping section of the west wall.

11.3.2 SKELETAL EVIDENCE

The cranium, mandible, first cervical vertebra, scapulae, sternum, right humerus, superior left humerus and left clavicle were not located within Room 17a or an excavated West Arm provenience. Each would have been within the intrusion zone immediately north of the *in situ* remains, assuming their deposit in normal anatomic position. No torso element above the level of the 1st lumbar vertebra is *in situ* other than a few middle and lower ribs. However, several vertebrae and rib fragments were recovered from nearby (filled in) animal burrows. The incomplete left humerus and forearm bones are in anatomic position. The right forearm bones are in anatomic position to each other, as are the carpals and most of the metacarpals. The probable explanation is that the missing bones were removed through the tunnel and out of the building, though whether deliberately or incidental to the actions is unknown. Evidence regarding this scenario may be obtained when the rubble mound exterior to Room 17a is excavated.

No grave goods were located but there is a strong possibility that one or more objects were removed at intrusion since most of the primary burials are accompanied. However, burned and unburned fragments of cotton cloth provide evidence of shrouding. Also, willow mat remnants directly underneath HR 4 extend to the west wall.

As shown in the Figure 11.5 laboratory photographs, the *in situ* inferior left humerus has a complete transverse break at midsection. The uneven appearance of the fracture surface is consistent with dry-bone damage occurring during Stage 5 corpse decomposition. This is also the case for the *in situ* ribs, the distal end of the left humerus, the anterior pubic regions of the ossa coxae, and the long bones of the lower limbs. The collapse of the roofing materials onto HR 4’s skeletonised remains could account for all or most of the dry-bone fractures, but it would not explain the absence of major bones. The likelihood is that the left humerus was fractured at Surface 1 collapse and then the proximal end removed during the intrusion along with the other major bones from the superior skeleton.

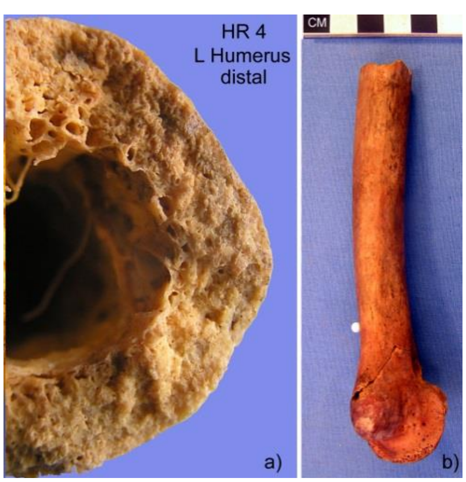


Fig. 11.5: Photographs of the superior (a) and lateral (b) views of the dry-bone, complete transverse fracture of the distal half of the HR 4 left humerus.

11.3.3 POST-MORTEM INTERVAL: PRELIMINARY CONSIDERATIONS

In sum, skeletal evidence indicates that prior to human disturbance, corpse decomposition was very advanced (Stage 5), with bones retaining little collagen. Stratigraphic evidence shows that intrusion occurred after the accumulation of Strat 6 fill over most of HR 4, though his upright knees still projected above this natural silty fill. This incursion also took place after the collapse of the east wall as a unit, the fire in 17b, and the collapse of the upper-storey floor materials onto the exposed upright knees of HR 4. Disturbance timing in relation to the development of strata above Strat 5 is unknown. Exterior evidence suggests intrusion occurred prior to the development of the large mound of fallen wall stones along the west wall.

Accumulation of Strat 6 natural fill and the various structure collapse events could have occurred within months or years following deposition of HR 4. The skeletal evidence indicates that this intrusion occurred well after deposition, probably on the order of years. This determination is largely based on the occurrence of dry-bone damage incurred at Surface 1 (17b) collapse. Considering the observed (wrappings) and inferred (temperature) decomposition variables, the probability is that corpse decomposition was quite delayed compared to the timescales observed in forensic research.

11.4 HR 11

11.4.1 STRATIGRAPHIC EVIDENCE

In short, the human intrusion into Room 27a involved: creating a hole within the compound masonry of the exterior south wall; walking across the upper contact zone of a stratum of Pueblo III construction fill (Stratum 7); digging through this unit; and, digging through subfloor burial pit fill (Feature 7). The pit fill characteristics are unknown since this material became intermixed with Stratum 7 clay chunk fill during this event. Each provenience is identified in the Figure 11.6 plan map of Room 27a; detailed plan maps of HR 11 elements and grave goods are contained in Appendix B. In addition, Figure 11.7 presents two cross-sections of the stratigraphy of Room 27a at the time of intrusion (a) and at research excavation (b). Finally, the Figure

11.8 profile map of the south wall depicts the region of the punched-through hole and the wall section superior to the hole that was affected by wall stone subsidence.

11.4.1.1 *Primary burial deposit context*

The corpse of HR 11 and grave goods were deposited in a subfloor burial pit cut into a Pueblo III use-surface (Surf 2), through three underlying floors, several fill units, and a Pueblo II hearth. At that time, Room 27a was accessible only through the raised-sill doorway (26a/27a) in the west wall. There was no hatchway in the upper-storey (Surf 1) floor. Also, entry through the large T-shaped doorway in the east, exterior wall, was blocked by the addition of the Annex in the 1130s.

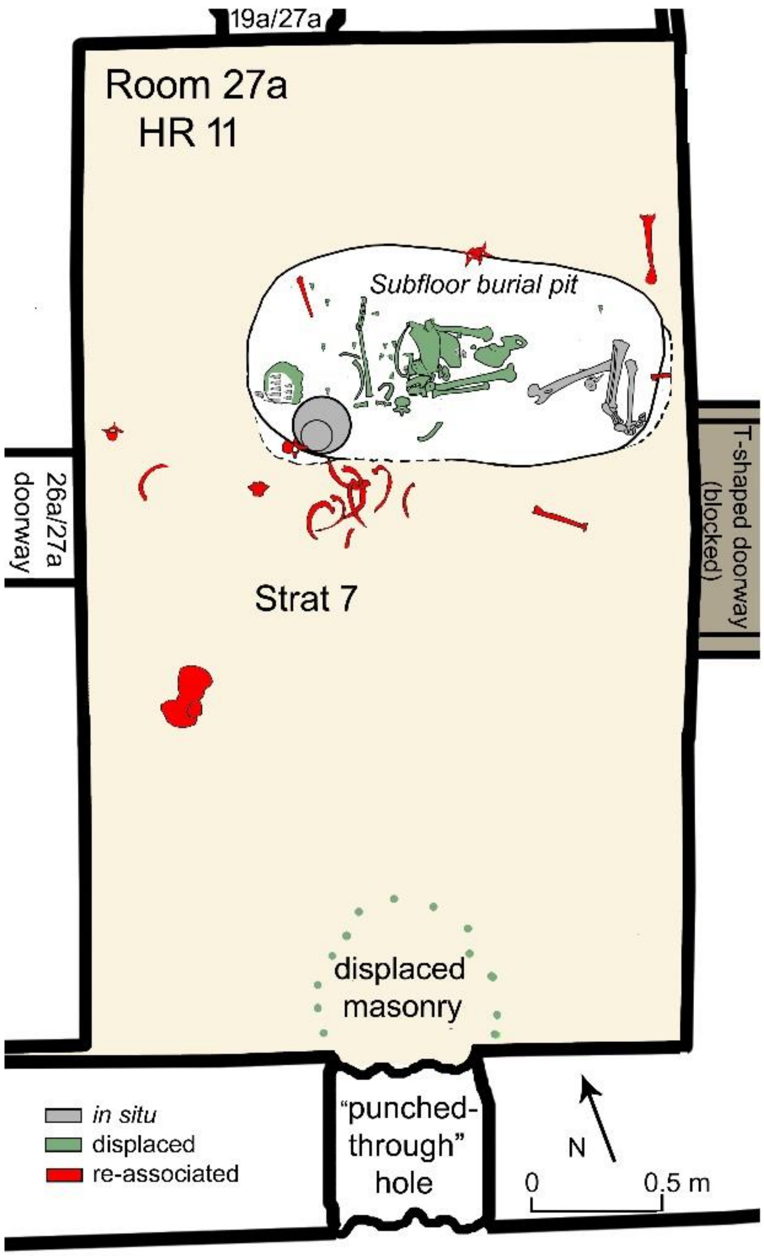


Fig. 11.6: Plan map of Room 27a showing: the point of intrusion in the south wall; location of the subfloor burial pit in relation to the east and west doorways; in situ and re-deposited HR 11 bones and grave goods; and, locations of HR 11 bones resting on the upper contact of Strat 7.

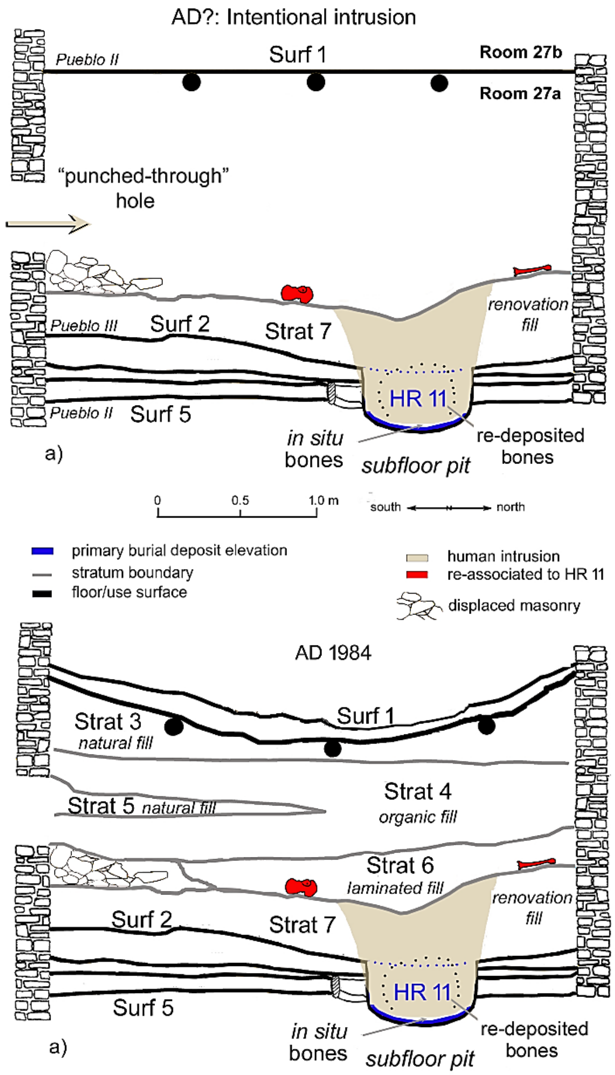


Fig.11.7: Profiles comparing cross-sections of Room 27a showing: a) stratigraphy at intrusion and b) stratigraphy observed during research excavation.

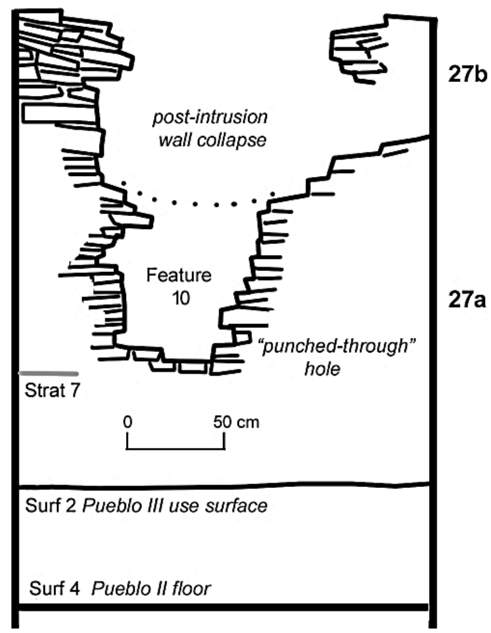


Fig.11.8: Map of hole in the south wall of Room 27a.

No evidence suggests that Room 27a was subsequently used for any purpose other than as a locus for construction trash. At some point, an uneven layer of clay chunk and sandstone fragment construction debris (Stratum 7), roughly 50 cm deep and which extended across the entire room, was dumped on Surface 2. The lower half of the west doorway was partly blocked either before or during this depositional event, but there was still sufficient clearance for animals to transfer carnivore-damaged bones onto the upper contact zone of Stratum 7 during the scavenging episode. The upper-storey 27b floor (Surf 1), which eventually slumped as a unit, was probably intact at intrusion. This would have yielded a clearance of roughly 1.5 meters between the ceiling and the upper contact zone of Stratum 7. Upright posture may not have been possible but it would not have been unduly cramped. However, if Surface 1 had already slumped, there still would have been roughly one meter of head room.

11.4.1.2 *Intrusion*

Entry was made via a “punched-through” hole in the approximate mid-section of the south, exterior wall of Room 27a. The elevation of the ground surface at intrusion is unknown, but the lower margin of the hole is just above the upper contact elevation of Strat 7. As is illustrated in Figure 11.7, the jumbled pile of displaced masonry immediately below the opening on Stratum 7 evidences an external intrusion, during which wall stones were pushed into the building to gain entry. None of these stones or the edges of stones bordering this hole evidence damage indicative of metal tools.

After walking across Strat 7 to a point roughly halfway across the room, the intruders commenced digging through some half-metre of dense construction fill in a location directly over the subfloor burial pit of HR 11. The south boundary of this pit is located at just beyond the north margins of the east and west doorways, which are highlighted in the Figure 11.9 photograph. Key points are that the outline of the subfloor pit in the Surf 2 floor would have been obscured and that Ancestral Puebloans did not mark graves, or at least not with non-perishable objects. The fill in this stratum has sufficient structural cohesion to conclusively state that there are no other disturbances even suggestive of human interventions. As can be seen in the Figure 11.10 photograph, the boundary of this intrusion is remarkably like the configuration of the subfloor burial pit, with just two minor divergences. No shovel marks were observed on the walls of this pit, nor in Strat 7.

11.9: Photograph of the location of HR 11’s original and disturbed subfloor burial pit in relation to the Surf 5, Pueblo II hearth and the alignment of the east (T-shaped) and west (raised-sill) doorways of 27a.

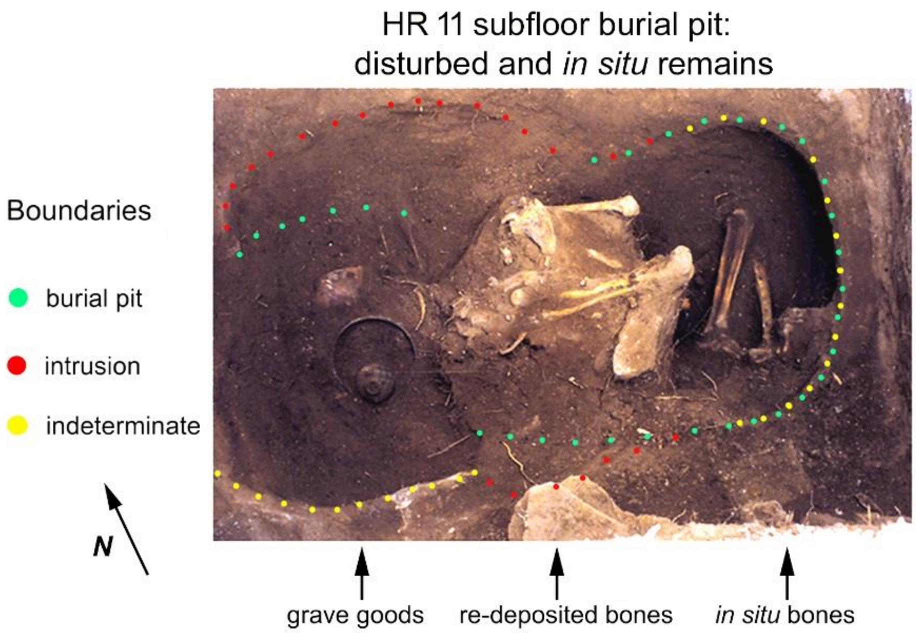


Fig. 11.10: Boundary of the human intrusion in relation to the HR 11 burial pit. This photograph also documents the in situ lower limbs and the re-deposited cranium and cluster of bones.

Whether any organic materials were used to block the south wall as the intruders vacated the building is unknown, but it was not plugged with masonry. The accumulation of laminated fill within Stratum 6 post-dates this intrusion, since this stratum of fine wind-borne and water-deposited fill is consequential to this break in the building fabric. Moreover, none of the fill units above Strat 7 are disturbed (apart from animal burrowing), including the regions of Strata 4, 5 and 6 that lie adjacent to the south wall.

11.4.1.3 *Skeletal evidence and grave goods*

The only *in situ* remains consist of all lower limb elements except for the right femur and right patella, and several bones from each foot. Structure 27 contains no ISE foot bones, and no South Suite pedal ISE are similar in size or development. Foot configuration indicates that each extremity was forced into a tightly flexed position whilst manoeuvring the lower limbs into position. Each left tarsal is present and *in situ.* All five left metatarsals are adjacent to the left tibia but are displaced from anatomic position; three of these are in anatomic position relative to each other but present the plantar surface, whereas the left tibia presents medially. Three Ray 2-4 proximal phalanges, the Ray 1 distal phalanx and a Ray 2-4 distal phalanx were recovered nearby. The bones of the right foot are largely in anatomic connection, though missing bones comprise the navicular, 1st cuneiform, 1st metatarsal, the Ray 5 proximal phalanx, four middle and four distal phalanges. The heel is slightly above the disposal surface; the forefoot rests upon the left hind-foot, so that the foot angles upwardly (anteriorly) above the disposal surface at a slight angle. Both Ray 1 phalanges are in anatomic position even though the 1st metatarsal is missing.

The absence of several labile connections could signal delayed deposition; however, that tarsals are also missing points to post-deposit disturbance by humans or burrowing animals. The latter may account for the absence of missing HR 11 foot bones from the South Suite. Deterioration can be ruled out since all recovered foot bones are in excellent condition. The inverted presentation of the left metatarsal AAU means that it rotated as a unit whilst interconnected by soft tissues. The full extent of skeletisation otherwise suggests that this displacement occurred prior to human intrusion.

This foot rotation suggests that corpse decomposition occurred in an open space, though whether this applied to the entire mortuary micro-environment is open to question. On the other hand, movement of this AAU into its discovered orientation by burrowing animals is a plausible explanation, especially considering that several foot bones are missing. Variation within the deposit microenvironment is another possibility, as it may mean that a void existed just within this small space. Skeletal evidence from HR 14 offers a similar circumstance, as she is also in a subfloor burial pit. In contrast to the disturbed remains of HR 11, her *in situ* skeleton is fully articulated and retains numerous labile and persistent anatomic connections. However, the mandible is displaced inferiorly, despite the fact that anatomic connections in all skeletal regions are indicative of deposit within a closed space (fill). This may simply mean that the bodies of HR 11 and HR 14 were wrapped in coverings that provided a temporary barrier to direct contact with burial pit fill, and thereby allowed the rotation of a small anatomic unit or downward movement of a single bone in a small void space "pocket." Nordenskiöld (1979:40 [1893]) describes a Step House burial in which the individual had been wrapped in a "shroud of feather cloth." Such wrappings were constructed by wrapping turkey feathers around yucca fibres to create a warm, fluffy blanket for winter. Considering the evidence of shrouding and the presence of willow mat fragments under and over several *in situ* burials, it is plausible that corpses were wrapped or covered with a feather blanket in place of, or in addition to, a shroud. Assuming so, this "feather cloth" might have served as a soft, slightly bulky and flexible barrier between corpse and fill that enabled the subsequent displacement of specific anatomic units prior to its own deterioration.

Yet another possibility is that HR 11's corpse was not covered with sediments at deposit. Analysis of the intrusion into the burial pit indicates that it involved some measure of excavation around the pit margins. This indicates that the pit contained fill at intrusion, but it is not evident whether this fill was deposited at interment or represents subsequent accumulations. Nordenskiöld (1979: 40, Fig. 21) documents a grave at Step House that has attributes of a casket. The subsurface pit had been covered by a configuration of thick wood crossbars which supported a woven willow mat, which was then overlain with soil. He only notes that the remains are well preserved, and his detailed drawing of this mortuary context shows no displacements. However, although Nordenskiöld was a trained scientist and keen observer, he was not an expert on human anatomy. It is also uncertain whether his drawing is an actualistic or schematic representation.

There are no organic materials to suggest that this type of grave covering was used at Wallace Ruin for any of the three Pueblo II (1) or Pueblo III (2) burial pits. The complete disturbance of HR 11's mortuary context eliminates the possibility of identifying the deposit context of his subfloor burial pit. Considering that all other Wallace Ruin skeletal remains in a burial pit evidences deposit in a filled space, the assumption here is that this pattern was observed for HR 11.

Most of HR 11's bones were re-deposited in a cluster within the middle of the pit at the end of the intrusion event; the cranium is, apparently, near its primary burial deposit location but rotated into a position not possible in a fresh corpse. The absence of articulated anatomic units among the disturbed elements indicates that skeletisation was well advanced if not complete at intrusion. Owing to the underlying alluvial fan and modern irrigation, the Wallace substrate is somewhat damp as is evidenced by the generally poor condition of bone surfaces in direct contact with the bases of all subfloor pits. Thus, the natural mummification of soft tissue would not have been possible even if the grave was constructed as a subsurface coffin. The evidence is thus consistent with Stage 5 decomposition at intrusion, although the extent of bone collagen loss by that point is unknown. Possibly, bones could still have been greasy even after the loss of all soft tissue connections. Dry-bone damage to HR 11 bones is uncommon, and there is no damage inflicted by carnivores. Green bone fractures are restricted to v-shaped grooves associated with an episode of violence around the time of death. On the other hand, it can be stated that there is no evidence of dry-bone impact or damage from metal tools, and bamboo knives were used near human bones during research excavation. Another salient point is that two ceramic vessels, 46 projectile points, a stone knife and an extremely unusual large, polished urolith (bladder stone) were located within the burial pit. Among these are 21 arrowheads that were intermixed with the re-deposited bones.

11.4.3 POST-MORTEM INTERVAL: PRELIMINARY CONSIDERATIONS

The stratigraphic evidence alone is conclusive that entry occurred prior to the development of Strata 4 through 6, and it probably occurred prior to the subsidence of the upper-storey floor. The timespan entailed in the development of these units is unknown, but the very good condition of Surface 1 argues that such accumulations represent a gradual process of considerable duration. The absence of articulated units among the disturbed remains suggests that this intrusion occurred many months or years after primary deposition, especially when considering that interment will delay decomposition (Işcan and Steyn, 2013:47), as would the (inferred) wrappings (Mann et al., 1990).

11.5 Arguments for prehistoric intrusions: Ancestral Pueblo

On the face of it, one would expect that the human intrusions are part of a well-documented pattern of disturbance of Ancestral Pueblo mortuary contexts by Euro-Americans operating in a non-research capacity. However, several factors argue against the intrusion during historic times (post AD 1850). Although there is no way of knowing the timescales for the development of the fill units that overly the regions of intrusions in Rooms 17a and 27a, the probability is that these accumulations developed many years prior to the historic period. The undisturbed stratigraphy that is both adjacent to the punched-through holes and above these areas of intrusion provides convincing evidence of entry prior to the development of these strata. The absence of metal impact scars on wall stones or along the margins of stratum disturbance is also inconsistent with a historic intrusion. Furthermore, the prime reason to intrude into Ancestral Pueblo mortuary contexts in historic times was to obtain, or "collect," the beautiful and well-made pottery provided as grave goods, as is notably the case at 5MT5 (C.Bradley, 2003). If this was impetus for intrusion into Room 27a, one would not expect the presence of two intact ceramic vessels within HR 11's burial pit, nor the presence of numerous projectile points or the unusual urolith "ornament" (as it may have been perceived by "collectors").

It is not known if intruders removed any items from HR 4's mortuary context. No grave goods were found, but such items at Wallace and other sites are typically adjacent to the cranium or a shoulder, so within the region of disturbance. Excluding HR 1, half of all Wallace Ruin *in situ* burials are accompanied by a ceramic vessel. To some extent, this may reflect the presence of age-grading, or at least the use of non-perishable items, since five of the seven unaccompanied individuals are young infants. Other than infant HR 2, of the Pueblo III burials only the two females in the double-burial have no grave goods. However, one would expect that even if such vessels were not deposited with HR 4, the detection of his skeleton alone would have prompted collectors to dig throughout the room. In such case, the Mesa Verde Black-on-white bowls by HR 3 and HR 5 would have been retrieved. Another clue that this intrusion occurred prior to the arrival of Euro-Americans is that no historic items were recovered from STR 17. Blackburn' and Williamson's (1997) study of early Euro-American associations with Ancestral Pueblo sites demonstrate that such residues are commonplace. Also, if this event occurred hundreds of years after the Ancestral Pueblo occupation of the MVR, it makes sense that the point of entry would have occurred nearer the apex of the exterior wall fall, rather than from a point originating at the widest and deepest accumulation of wall fall.

Disturbance by Native American nomadic groups that entered the MVR after the 1200s is highly unlikely. There is a reasonable potential that infant HR 1, within an informal stone cist near the apex of a wall fall stratum in Structure 9, is an intrusive

Native American burial deposited after the 1200s to perhaps as recently as the early 1900s. Though an Ancestral Pueblo identity is another possibility, Bruce Bradley's (pers. comm, 2015) interpretation is that this deep accumulation developed over a prolonged time span, probably subsequent to the Ancestral Pueblo migration from the MVR. Even if this infant was a member of one of these nomadic groups, there is no archaeological evidence or local oral tradition that Ute (Numic) or Diné (Navajo) individuals have deliberately targeted Ancestral Pueblo burials. In fact, the opposite condition is a fundamental aspect of the religious beliefs of both groups. The cliff-dwellings of Mesa Verde were well-known to Ute Indians long before their "discovery" by local ranchers Richard Wetherill and Charlie Mason in 1888. According to Wetherill, Ute Chief Acowitz told him about a house "high up in the rocks" that Utes never visited there since it was sacred; he also stated that "When you disturb the spirits of the dead, then you die too" (Roberts, 1929 :28). In similar vein, Diné attitudes towards mortuary contexts are that they are to be strictly avoided, as are any items touched by the deceased (Navajo Nation, 2016).

11.6 Deviant "Un-burial" or Sanctioned Retrievals?

11.6.1 WALLACE RUIN SYNTHESIS

The most credible explanation is that the intruders were Ancestral Puebloans who had specific knowledge of the location of each mortuary context, either as a burier or though oral tradition. The more compelling argument involves the disturbance of HR 11 in Room 27a. The outline of his subfloor burial pit, which was cut through the Pueblo III use-surface (Surf 2), would not have been observable at intrusion since Surface 2 was overlain by a deep layer of construction fill. The margins of the intruded area so closely replicate the boundary of the burial pit that the probability of chance discovery is minute. On the off-chance that his subfloor grave had casket attributes, eventual subsidence of overlying fill into the pit might have provided a visual clue as to its location beneath the layer of constructional fill. This is just a possibility, but the configuration of the east and west doorways would have provided a reliably obvious, and memorable, location marker since the pit is situated along an alignment formed by the north margins of each doorway. The intrusion into Room 17a seemingly required less knowledge of location. Yet, this tunnelling effort also took a direct path, without disturbance of HR 5 though the latter may have been coincidental.

Similarities in disruptions within both mortuary contexts indicate that the intent was to retrieve a specific object or objects. What it, or they, may have been is obviously unknown, but it is clear the artefacts left in HR 11's subfloor pit were not desired. It seems that the expectation was that the object(s) would be near the superior half of each skeleton since the lower limbs are undisturbed in both cases. Even though HR 4's skull is missing, the presence of HR 11's cranium and mandible suggests that the head was not the primary point of interest. The fact that HR 11's mandible was grouped with the clustered bones, rather than being re-positioned next to the re-deposited cranium, signals a relative disinterest in his skull as a symbolic representation of HR 11 as an individual or as a member of a lineage or social group (Bonogofsky, 2011).

The absence of most of the superior torso bones suggests that removal of HR 4's skull is more likely related to logistical difficulties faced in gaining access to a mortuary context situated under layers of structure collapse. Cotton fabric remnants within the pelvic region and the lower limbs provide evidence that this individual was shrouded, and possibly fully enclosed as is the case of the nearby HR 3. Possibly, the missing bones were removed from the room when material that enwrapped the superior half of the skeleton was pulled through the tunnel, as components within the inferior mortuary context were held in place by the weight of overlying fill. Alternatively, though dry-bone evidence is consistent with complete skeletisation, the Southwest climate allows for the potential that missing elements were yet connected by tough, desiccated soft tissues that necessitated their removal as a unit (Ubelaker, 1997:81).

It is indeterminate if both intrusions were part of the same episode or if they represent unique events involving the same, or different, individuals. Considering that such incursions are not documented elsewhere in the MVR, the parsimonious explanation is that they are part of the same event. Whether both intrusions were intended at the outset is also a mystery. There may have been certain knowledge of who had been deposited in each mortuary location and what both contexts contained. Alternatively, on the basis that intruders had either direct or received knowledge, the disruption of both contexts may represent faulty memory. Even though they are in different rooms, there may have been some confusion since both individuals are males of similar age and size. This is a reasonable possibility given the extended lapse of time between primary deposit and disturbance.

The effort involved in one, let alone two such intrusions, signals an undertaking requiring significant effort. To recapitulate, at the time of the AD 1180-1220 depositions of HR 11 and HR 3 (on the same elevation as HR 4), the nearest habitations were some ten km distant. The Wallace Ruin decomposition variables described in Appendix D, which almost certainly entailed prolonged Stage 4 and 5 timescales, the skeletonised status of HR 11, and the skeletonised, dry-bone status of HR 4 at intrusion, allows for the possibility that disturbance occurred after the relocation of most Ancestral Pueblo communities to locales roughly 24 km distant at about AD 1250. Either way, the effort required would have involved walking many kilometres, creating large holes in thick masonry walls, and then digging down into or tunnelling through chunky clay or burned adobe strata.

11.6.2 SAN JUAN REGION COMPARISONS

The deliberate intrusion into two mortuary contexts apparently involved the setting aside of social and religious conventions, if not sanctions. The Ancestral Pueblo residential mortuary program indicates that they were comfortable with proximity to the dead. Evidence concerning the intentional disturbance of Ancestral Pueblo mortuary contexts by prehistoric human agents is rare among the hundreds of sources assessed in this study, except, perhaps, Chaco Canyon. The absence of incontrovertible evidence of such events provides compelling grounds to infer that such actions were to be avoided. The notable skeletal disarrays in the North and West Clusters of Pueblo Bonito have been attributed to natural processes (Pepper, 1909) or prehistoric looting (Judd, 1954:338). Akins (1986:124) argues that these Bonito disturbances and those involving displaced, isolated elements in Chaco's domicile sites may represent secondary deposits involving serial interments. Although Marden (2011:368-372; 376) attributes some movements of North Cluster bones to carnivores, she infers that many of the disturbances involving Canyon great house and small site (domiciles) burials may have been a “normal” aspect of the Chacoan mortuary program in which mummified bodies or skeletal elements were carefully re-arranged. As discussed in Chapter 12, the reverencing of ancestral bodies is central to house society formation, so this interpretation is plausible on those grounds.

However, the careful arranging of ancestral bodies contrasts to Judd’s (1954) field photographs of disturbed West Cluster skeletons, including Plate 91 (lower) in which several clustered crania are in the northeast corner of Room 320. These are not carefully ordered, but commingled with other skeletal elements. Wills (2009:300) suggests that such displacements represent an attempt to sever relationships: either performed by group members to “depersonalize individuals” so that they can enter the realm of collective memory; or, undertaken by vandals’ intent to disrupt the relationship between the dead and powerful mortuary rituals. In the case of the latter, this could also involve the notion that power is gained by the violation of enemy burials.

Unfortunately, detailed taphonomic analyses are limited to Marden’s North Cluster study. Moreover, Akins’ (1986. Appendix B.1) descriptions of “scattered”, “disturbed” and “secondary or disturbed” contexts from Chaco Canyon domiciles that Marden (ibid., 372) refers to are not considered in terms of potential site formation processes, by either of those researchers. Nor is there analysis regarding whether specific bones were moved, as in Nilsson Stutz’s (2003) consideration of the circulation of bones in Mesolithic sites. In contrast, as noted by Karhu (2000:66) and Martin and co-authors (2001:132), the relocation of bones by Ancestral Puebloans in MVR sites usually involved burrowing animals or such unintentional disturbances involving building expansion, the transferring of fill containing skeletal remains from one place to another, or accidental intrusion into a grave. During this study’s comprehensive analysis of San Juan Region mortuary contexts, several such events were identified; however, these deposits are comparatively rare and usually involved the very poorly represented skeletal remains of one or two individuals. Such re-deposits involving roomblocks overwhelmingly involve domiciles like 5MV34 (O’Bryan, 1950) and Morris 41 (Morris, 1939:90-95).

So, while some of the evidence above is suggestive that there is some complexity to post-mortuary actions beyond natural events or looting, little is based on explicit empirical evidence regarding skeletal remains or close examination of the discovered contexts relative to site formation processes. Moreover, from the sketchy evidence available, it is not evident that specific mortuary contexts were targeted, regardless of impetus. Thus, interpretations based on the presumed intentionality of post-deposit interactions with skeletal remains in Chaco sites are intriguing but tenuous.

Although direct analogy may be inaccurate owing to significant changes in Pueblo belief systems with the (precontact) adoption of the Kachina religion, in the historic period, the deliberate disturbance of a grave is equated with witchcraft by these and other Southwest groups (Walker, 2008). According to Parsons (1929) Pueblo witches had the power to resurrect the dead, usually individuals that they have killed, to capture their spirits or to make use of their corpses for “medicine.” For this reason, the corpse is watched at the gravesite for four days to make sure that there is no interference, including by witches in their animal forms (Goldfrank 1967:145-146). Such a narrow timescale is clearly distinct from the Stage 5 decomposition status of both HR 4 and HR 11.

11.7 Conclusions

From the detailed consideration of the stratigraphic evidence, it is evident that these human intrusions into the mortuary contexts of HR 4 and HR 11 were intentional, purposeful and requiring significant effort and planning. The combination of skeletal and stratigraphic evidence indicates that these loci were intentionally disturbed during the prehistoric period, apparently by a person or persons who had personal or received knowledge of where these primary burial deposits were located. Apparently, HR 11 succumbed to arrow wounds. The possibility that his interment in a subfloor location represents a deviant practice owing to circumstances related to his death is undermined by the occurrence of individuals in subfloor pits with no obvious skeletal trauma. However, his advanced skeletisation argues against the possibility that this intrusion was related to witchcraft. It might be that the same individual killed him and then participated as his burier, then decided years later to recover something from his grave. However, that scenario seems far-fetched when considering the timescale, potentially on the order of decades, and the degree of effort involved to gain access to two mortuary contexts in non-connecting rooms.

The correlation of corpse decomposition, carnivore damage and stratigraphic information provides a means to establish the PMI for the intentional disturbances of and HR 11 and HR 4. The two intrusions by humans represent discrete actions because they took place in two non-connected rooms; however, whether they involved related efforts occurring during a single episode cannot be ascertained from empirical evidence. In the case of HR 11, there is no carnivore damage to bones that were removed from his burial pit and then left on the upper contact zone of Stratum 7, whereas carnivore-damaged ISE are also rest upon this contact zone. This circumstance provides indirect evidence that the human intrusion post-dates the carnivore episode. That said, the plugging of the exterior T-shaped doorway in the south wall of Room 26 provides better evidence for a later intrusion by humans through the south wall of Room 27. The absence of carnivore damage to any bones in Room 17a indicates that the intrusion into the room also occurred after the natural incursion that caused such considerable damage to South Suite primary burial deposits. The fact that access to HR 4 entailed tunnelling through fill further diminishes the potential that carnivores could gain entrance into the room.

Although a personal agenda cannot be ruled out, the violation of deeply embedded Ancestral Pueblo norms regarding the avoidance of the intentional disturbance of the dead would have been an additional impediment beyond the multiple logistical difficulties. A more plausible explanation based on sanctioned socio-religious motives is addressed in the next chapter, which considers the significance of ancestral bodies and bones as signifiers of a house society “memory regime”. However, as noted above, the apparent intersection of personal and social memory in these intrusions seems to have been focused on the objects placed with one or both individuals rather than their mortal remains. In contrast, the structured deposition of the bones of iLink 326 in Room 5a provides an unqualified example of an intentional interaction with the bones of the dead.

CHAPTER 12: DISCUSSION

HOUSE SOCIETY AT WALLACE RUIN

12.1 Introduction

In her analysis of the archaeological evidence from Yellow Jacket Hamlet Site 5MT3, Mobley-Tanaka (2005:51) offers a functionalist perspective in which the Pueblo III shift from middens to abandoned rooms for primary burial deposits involves the availability of masonry surface rooms versus earlier *jacal* structures. In the view of Schlanger (1992:98), deposit on a room floor may indicate a breakdown of routines of daily life, population decline, adverse conditions that prompt the abandonment of structures, and "an emphasis on narrower rather than broader social affiliations." Though this view also fails to take potential symbolic attributes of architectural spaces into account, it echoes Morris's (1924:224) interpretation of Aztec Ruin's sparsely accompanied floor depositions versus those in room fill or subfloor contexts. However, during the timespan of Wallace Ruin's Pueblo III burials, regional population was on the upswing and climatic conditions were generally favourable for maize agriculture. Although Bruce Bradley's Chacoan Revitalisation hypothesis specifically references the development of the Kachina religion in the mid-AD 1200s, the migrations into the MVR during the late AD 1100s and early 1200s could just as well have prompted a response to "adverse" social conditions, even if primarily in perception, as MVR population adjusted to new groups with their own histories and traditions. Potentially, the violent death of HR 11 from arrow injuries and, possibly, the mid-face fracture of HR 3 could represent small-scale altercations associated with a somewhat unstable social landscape.

This study's various analyses provide conclusive evidence that the Pueblo III use of Wallace Ruin as a mortuary facility does not represent an MVR or MSJR community of practice extant before AD 1180 or thereafter. Rather, it references practices limited to just two burial clusters at Pueblo Bonito, established some three or so centuries prior. Interestingly, Mills (2015:263) describes the depositions of burials and objects in those rooms as an Ancestral Pueblo "memory regime that has few precedents or antecedents." Possibly, as implied in Bradley's hypothesis, both variant mortuary programs involved periods of social re-adjustment that prompted a focus on a narrower social affiliation. In the case of Wallace Ruin, this seemingly involved recalling Chaco Phenomenon times and its material expression. However, it is difficult to parse whether this “look back” entailed personal memories of places, objects and events or abstract concepts, traditions or histories passed down through the generations. Plog and Heitman (2010: Fig.4) report median calibrated AMS dates for 10 individuals from Room 33 of Pueblo Bonito. None is later than AD 1100, though the two-sigma (95.4% probability) results for four skeletons extend into the AD 1180s (Ibid.:Tab.1). Accordingly, there is an outside chance that these four overlapped with the earlier Pueblo III primary burials at Wallace Ruin. Another possibility is that these dates are concurrent with the final years of habitation at Wallace Ruin in the mid-AD 1100s. In such case, depositions at both great houses may have occurred within the lifetimes of the older Wallace Ruin deceased or their buriers. The greater probability is that some Bonito depositions took place no more than the lifespan of one generation removed.

If so, then some Pueblo III individuals may have had specific memories of life at Wallace Ruin, either as former residents or as visitors during its pomp. Alternatively, they may not have had a direct connection with Wallace Ruin, but perhaps travelled to Pueblo Bonito on ceremonial occasions while an older child, adolescent, or a young adult. The sounds, images and novelty of such occasions are likely to have generated emotions that help establish enduring memories and feelings of affiliation, as was presumably the intent. Such recollections may have been described to the next generation or two, along with embellishments and errors of memory.

Long-term memories are established through repetitive actions that draw attention to specific processes and details, or they can be consequent to an intense emotional arousal, including those that are intentionally induced (McGaugh, 2003). Yet, in their analysis of the accuracy of eyewitness accounts, Wright and colleagues (2009) note that an individual’s memory is imperfect. It is subject to the forgetting of key details, confusion over what was observed or experienced, influenced by what other people recollect, and affected by perceptions of what should, or should not, be recounted. Thus, while conversations about past experiences at Chaco Canyon, Wallace Ruin, or recent forbears may have simply entailed passing time through “story-telling,” social upheaval may have turned attention to tales of ancestral past glories. Rowlands (2007:70) reports that in modern groups, territorial and economic claims are legitimised through the “creation of alternative pasts” as communities engage in the construction of shared memories.

12.2 The House Society Model, Revisited

Beck (2007) identifies four principal house model attributes suitable for archaeological analysis: architectural spaces, origins, a focus on ancestors, and the presence of inalienable (communally owned) heirlooms. Although each variable is introduced separately below, ancestor veneration practices serve as a fundamental interconnecting dynamic. Additional insights regarding archaeological cognates of these traits draw upon Mills (2008; 2015).

12.2.1 ARCHITECTURE

As construed by Beck (2007:7), the house, which includes the building and its immediate environs, represents the physical space in which a common identity is forged and social relationships are structured. Identity construction is accentuated when a house’s architecture differs substantially in scale or embellishment from that of nearby residences, or when it contains the remains of ancestors who are invoked during rituals. Beck does not specify the types of rituals involved. However, identity is structured and becomes embodied through mundane rites of daily life, informed discourse and participation in formal ritual occasions, though always with the capacity for transformation through individual agency (Bourdieu, 1977; Giddens,1984).

The spatial relationship between the dead and the house is a significant aspect of ancestor veneration, in which “the dead become part of and indeed are indivisible from the buildings and shrines that situate that house” (Gillespie, 2000c:19). In his study of Peruvian ancestor veneration practices, Lau (2015) discusses the significance of the collective tomb in terms of embodied practice, with his point being that such spaces provided a locus, or necropolis, in which the living could interact, and even physically engage, with the potent “community of the dead.” Isbell’s ethnohistorical (1997) study of Incan mortuary monuments highlights extreme examples in which seated royal Inca mummies "inhabited" their own house between celebrations involving the parading of their clothed and enthroned bodies on litters.

A significant aspect of the house model is that the use of the "family crypt" does not necessarily entail burial within or near the residence of the deceased. Rather, the relevant location is that established by the "house society." This concept is consistent with ethnographic evidence that Puebloans store ritual paraphernalia in a room recognised as the "ancestral home" of a specific (ritual) society (Judd, 1954:281). On the other hand, Puebloans do not use domicile rooms for primary burial deposits, at least not since the imposition of Spanish-Catholicism in the AD 1600s.

12.2.2 ORIGINS

In the words of Beck (2007:8), origin narratives that "celebrate the primordial beginnings and deeds of the illustrious founders" are crucial to establishing the status and legitimacy of a house society. Beck draws attention to the ideas of Helms (1998:74-77) regarding two elements of house origins. *Prior house origins* encompass relational priorities formed within the lifetime of members of a house society, such as connections between a parent and child or between siblings. *First-principle origins* pertains to the *absolute* founding house by which all descendent house societies are connected, or perceived as connected, including those purportedly associated with tales of emergence.

In the absence of social relationships based on class or contracts, house societies and their rituals provide an organisational structure that mediates stresses brought about by migrations of peoples from diverse places and histories (Gillespie, 2007:41). As an example of the "last to arrive" dynamic, Mills (2015:264) makes the case that migration scenarios involve the need for latecomers to negotiate interactions with the local population in a process that leads to the formation of new identities. She infers that the tensions and conflict within and between migrants from numerous and large Pueblo I villages of the NSJR provided the catalyst for the formation of house societies at Chaco Canyon, and specifically those at Pueblo Bonito. Moreover, the rituals embedded in these groups provided a means to establish rights to lands and other resources.

Notions regarding origins and emergence are central to Pueblo cosmological concerns and, for some groups, economic considerations (Dozier, 1970; Ortiz; 1967; Parsons, 1939). In contrast to other Pueblo groups, Hopi clans had a ranked status determined by their order of arrival at the Hopi mesas. Allocation of horticultural lands was determined by seniority, with the best lands reserved for the members of the highest-ranking clans. However, apparently to garner more resources for higher status clans, the clans with the least status were highly encouraged or forced to leave the Hopi mesas during drought or famines (Eggan, 1964:125).

The identification of origins in San Juan Region archaeological groups is extraordinarily complicated due to the complexity of the "to and fro" migration patterns described in Chapter 3. This movement across the length and breadth of the San Juan Region also applies to the years between the AD 800s and the founding of Wallace Ruin in the mid-AD 1000s. Though not addressed previously, this additional information is relevant given Wilshusen and Van Dyke's (2006) arguments for a ninth century connection between the MVR and Chaco Canyon. In sum, they raise the possibility that the individuals who established McPhee Village (Dolores Locality) c. AD 840 are Pueblo I immigrants from the region of Chaco Canyon. In turn, the earliest great houses of Chaco Canyon, which includes Old Bonito, may have been constructed by the late AD 800s immigrants from McPhee Village and other MVR Pueblo I communities. The area north of the San Juan was largely depopulated by c. AD 900, as groups relocated to the MSJR, Chaco Canyon and the east slope of the Chuska Mountains of western New Mexico.

12.2.3 ANCESTORS

Rather than a means of reverence, ancestral rites may involve attempts to communicate with the dead (Steadman et al., 1996:64). When referring to the ideas of Helms (1998:28), Beck (2007:8-9) states that due to their durability bones are perceived as having "the power of perpetuity" that links the living house to its prior and primordial past. Ancestral bodies may be construed as physical conduits of vitality, or the source of life in the present (Lau, 2015:203). Consequently, the curation and commemoration of the dead within its walls is a crucial means by which a house society establishes its socio-ritual influence and thus rights to territorial and natural resources (Gillespie, 2000b).

In terms of prehistoric house societies, a salient concern involves segregating mortuary contexts that are credibly indicative of the prominent ancestor veneration rites crucial to house society organisation from those that are not. For example, in his analysis of social factors embedded in Pueblo II and III population movements within the MVR, Varien (1999:210-11) argues that abandoned domiciles and their associated burials served as important symbolic elements in the negotiation of claims to productive resources. Likewise, Mobley-Tanaka (2005) infers that the Pueblo III concentration of burials (10) within Household 2 of 5MT3 represents kin ties to the vicinity of Kiva 17, a Pueblo II kiva still used in Pueblo III times. Yet, while such residential burial practices may have established rights by heritability, they did not necessarily involve the pronounced, archaeologically detectable purposeful actions that are integral to structuring practices of house societies.

12.2.3.1 *Scale: Number and Timescale*

The size of the skeletal population alone is not necessarily relevant, since such rites can entail collective, "group ancestor veneration," involving the sequential deposition of multiple individuals over time, or "individual ancestor worship" focused upon a single individual (Li, 2000). In terms of mortuary contexts involving multiple burials, evidence of a pattern of depositional practice within a given location, whether house or family tomb, over an extended timescale is a credible indicator of ancestor veneration practices (Lau, 2015:201). In contrast, a mass, concurrent deposition may represent a response to a catastrophe, as for example at Woods Canyon Pueblo (C. Bradley, 2002).

12.2.3.2 *Age and Sex*

Ancestor veneration notions are variable in terms of the demographic attributes of age and sex. They may be strongly if not exclusively gender-based, as in the patrilineal emphasis occurring in traditional Japanese and Chinese peoples (Lebra, 1993). However, the ancient Maya included both males and females in their ancestral displays of power and prestige (Gillespie, 2000b:473). Similarly, Tewa

Puebloans believe that both males and females are needed to maintain a village, just as male and female ancestral spirits watch over houses (Ortiz, 1969:31, 83-85). Furthermore, the credible detection of this religious notion in an archaeological culture is complicated by the potential that additional logics may have influenced mortuary location decisions. So, for example, might the deposition of infants within a building instead reference the future via biological notions of fertility, as in Pueblo cosmological associations that link maize agriculture, fertility rites and socio-ritual reproduction (Dozier, 1970; Ortiz, 1969)? Alternatively, an infant deposition within a domestic space could signal a maternal connection (Schofield, 2014). Either notion could explain the deposit of foetus/neonate HR 8 within an arrangement of corn-grinding implements in Wallace Ruin's Room 19, as well as the deposition of MVR infants and females of reproductive age in mealing (maize grinding) rooms (Mobley-Tanaka, 1997).

While the tendency is to think of "ancestors" as individuals of mature sexual development, they also can include individuals who had not attained reproductive capacity at the time of death. In ancestor worship, the veneration of descendants is implied owing to expectation that they will, in turn, perform the rites and actions needed to venerate their ancestors (Lebra, 1993:106). Alternatively, some Bantu groups ascribe to the belief that souls are shared through the generations, including the dead and those not yet born, so that each birth entails both a splitting from and the reincarnation of a deceased ancestor (Sangree, 1974:68-69). Ortiz (1969) does not discuss Tewa Pueblo beliefs regarding actions undertaken during the afterlife in terms of an individual's age at death. However, since an infant becomes Tewa at the naming rite held four days after birth (Ibid.: 969:30), the belief that the recently dead will make efforts to influence ancestors on behalf of the living (Dozier, 1970; Ortiz, 1969) could apply to all decedents, regardless of age at death. Thus, while the presence of sexually mature individuals provides the most credible evidence for a mortuary program with an emphasis on ancestor veneration, the presence of just pre-pubertal individuals in the skeletal population does not necessarily exclude its possibility. Moreover, the rejection of ancestor veneration on demographic grounds is insecure when a site is not fully excavated, as in the case of Wallace Ruin.

12.2.4 INALIENABLE HEIRLOOMS

As defined by Mills (2004:238) inalienable heirlooms are communal possessions which "are to be kept rather than exchanged, are imbued with economic and symbolic power that cannot be transferred, and can be used to establish and authenticate the ritual authority of a corporate group." Drawing upon Weiner (1992), she adds that such possessions can include rights to lands and ritual knowledge in addition to tangible objects more readily observed in archaeological cultures. Mills goes on to say the use or mere observance of such heirlooms in daily and especially ritual life serves to connect past to present through the "memory work" that constructs social memories and, thus, social identities.

In respect to house society strategies, Beck (2007:9) states that communal possessions "situate members in reference to shared history and individual status," including renowned individuals or ancestors, through the fabrication, exhibition and exchange of such valuables. Such objects of memory materialise historic social interactions that establish house society identity and relationships within and between houses, including those of rivals (Mills, 2004:240). The construction of inalienable objects, and the knowledge of how to use them, is a key component of this process since this particular information is enchained through links between specific members of a house rather than the community at large (Ibid.:238). Thus, a possession's inalienable identity may change through time as individuals, or groups, re-interpret its meaning or significance in the extant cultural context (Beck, 2007:10). In the view of Mills (2008:378-80) such memory work also encompasses refurbishment of objects for continuing use as well as ritual retirement through discard in secure places construed as different from accessible, mundane spaces.

12.2.4.1 *Iconography*

Inalienable objects function as material metaphors since they represent, or are perceived as imbuing, the significant symbolic concepts shared by a house society. According Lakoff and Johnson (1980:33) this type of metaphor "allows us to comprehend a wide variety of experiences with nonhuman entities in terms of motivation, characteristics and activities." So, for example, in terms in the pan-

American metaphor PEOPLE ARE CORN, components of the human body are construed as equivalent to corn plant morphology (Black, 1984:282). Thus, for Puebloans, an ear of corn stands for a human body (Ortiz, 1969; Washburn, 2012). Lakoff and Johnson (2003:149) also identify MIND IS A CONTAINER as a metaphorical representation in which the mind "holds" abstract ideas. Hays-Gilpin (2008:258) proposes an analogous metaphor that associates containers with both human body and mind. She holds BODIES ARE VESSELS is probably a universal metaphor rooted in bodily experience as containers of water, food and babies as well as such intangible phenomena as spirit and soul. She further posits that effigy vessels that represent the entire body or a body part, such as breasts, provide archaeological evidence for the existence of the obverse VESSELS ARE BODIES metaphor in pre-Contact communities. Though effigy figures may simply depict an outline of the human form, Lau (2015: 228) suggests that figurative body vessels can contain liquids intended to meet the needs of the dead. At the same time, the pouring of liquids from them stands for the loss of bodily fluids during decomposition in a process instigated by ancestors and, ultimately, the process of becoming an ancestor. Ortiz (1969) describes the significance of "water giving" and "water-pouring" in various Tewa rites of incorporation and curing, all of which ultimately associate the individual with ancestors.

12.3 House Society at Pueblo Bonito

Lekson and colleagues (2006:10-11) describe the early, core units (c. AD 850-1000) of the buildings that would become large Chaco great houses as "monumentally up-scaled versions of regular domestic structures" (kiva units). In contrast, they report that during the next 150 years, various construction additions created a building form no longer in keeping with domestic architecture. Rather, these great houses, and especially Pueblo Bonito, had advanced building technological and artistic attributes, and they contained vast numbers of storage rooms controlled or inhabited by a small number of families. Thus, at the time of the (dated) first primary burial depositions in Old Bonito, North and West Cluster rooms were part of founding domiciles.

In her attempt to make sense of the anomalous mortuary and ritual objects at Pueblo Bonito, Mills (2015) presents her case that these deposits represent the presence of two different house societies, with that of the North Cluster having greater dominance (Ibid.:263). Of note, though the term “society” in Puebloan ethnographies refers to a ritual subgroup associated with kivas, Mill’s use of the word pertains to a social organisational construct associated with domiciles. The likelihood is that there is a significant degree of overlap between the functions of a “house society” and a Puebloan “kiva society” though recruitment processes for the latter may have been less flexible (Dozier, 1970). Mills (2015:263) also infers that the intermittent depositions of people and ritual objects within rooms provides an “archive of the social house,” in which every act of burial serves as a reminder of each participant’s place in that subgroup. In her view, these actions represent logics associated with a high-visibility emphasis on ancestors to entrench individual and group identities through a community of practice that acquired and transmitted ceremonial knowledge. Although the periodic nature of the Clusters’ depositions probably entailed aspects of personal memory, a group’s intent to reproduce, selectively reinforce or modify notions and practices is an attribute of social memory (Williams, 2006).

Mills (2015:256-257) holds that each of the four major house society variables are represented in one or both burial clusters. To summarise her findings, in terms of architectural elements, specific rooms within two sections of Pueblo Bonito were used as “family crypts.” Also, both sexes are represented in both burial clusters, but only the West Cluster contains infants and children in addition to older adolescents and adults. In terms of origins and primacy, these chambers are located within Old Bonito; moreover, AMS dates indicate that the earliest depositions are contemporary with the initial construction events at Old Bonito in the late AD 800s. The presence of numerous primary burials within these rooms, along with evidence of intermittent primary burial deposits over a prolonged timespan, is indicative of a focus on ancestors. Mills (Ibid.:255) identifies secondary burial deposits in the North Cluster as a hallmark of ancestor veneration; however, Marden’s (2011; 2015) re-analysis evidences that these bones are from disturbed skeletons. Finally, the extraordinary amount and variety of objects found within these rooms include such inalienable heirlooms of cylindrical vessels, deposits of turquoise and ceremonial sticks, and items used in altars.

As interpreted by Mills (2015:258), the turquoise deposits in the corners of Room 33 were intended to dedicate this space whereas other turquoise concentrations directly associated with burials were personal adornments. She proposes that items deposited in an accessible, open space may represent commemorative deposits of personal items by house members as a means to connect themselves to renowned ancestors. Thus, the mortuary deposit can include personal possessions of the deceased, those of mourners, the ritual retirement of inalienable objects, and subsequent deposits of objects (Mills, 2004; 2008:245).

Given these possibilities, the most credible identifications of Ancestral Pueblo inalienable heirlooms entail substances unsuitable for personal use or adornment. In the view of Mills (2004:243), altar furniture provides secure archaeological evidence for inalienable objects. Puebloans create rite-specific temporary altars, out of various materials, which can entail direct and symbolic connections to ancestors (Fewkes, 1899:253-262) or other considerations. Pueblo altars are highly variable in form, and as shown in Figure 12.1, are comprised of a mixture of inherited and new components assembled for specific rituals, primarily held in kivas (Judd, 1954; Mills, 2008; Parsons, 1939).

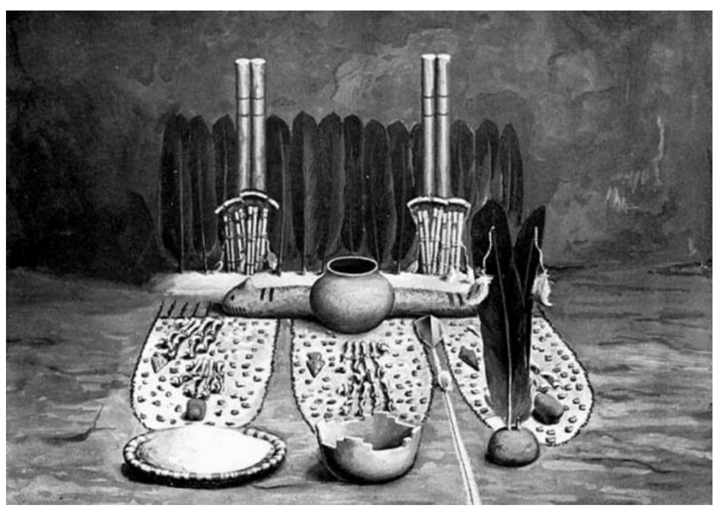


Figure 12.1: Artist Mary Leighter's drawing of a Tûñtai (Winter Solstice) altar at Hano Pueblo. (Fewkes, 1899: Pl. XVIII).

(public domain)

Fewkes (1899) reports that some of the Tewa families who moved from the Rio Grande region and founded Hano (c. AD 1700) brought altar segments used by each group's ancestors. During rituals, these family groups re-assemble these ancient altar parts along with fetishes meaningful to that group to invoke ancestral spirits. His publication includes Mary Leighter's drawing of one such altar, though other family altars included a mask or wooden crooks. The symbolism of crooked sticks is variable, but those built into altars of Antelope and Marau Societies specifically represent the deceased (Judd, 1954:269). Between ceremonies, altar constituents are stored in a domicile or society room. According to Bunzel (1932:491), "The possession of a major fetish… protects the house… and makes the house valuable".

Pueblo Bonito contains numerous counterparts observed in Pueblo altars, though it is acknowledged that their symbolic meanings were either never interpreted in like manner or may have changed through time (Franklin and Reed, 1999; Pepper, 1920; Judd, 1954; Mills, 2008). Inalienable objects include ceremonial sticks, shaped and painted wood, ground slabs, painted slabs, vessels and other objects of unfired clay, *tchamahias* (polished "hoes" of chert or jaspar), various small items of exotic and natural materials, and concentrations of white sand. Iconographic forms associated with altars include human and animal effigy figurines, human effigy vessels or fragments of identifiable anatomic parts (arm, breast, foot, etc.), and ground slabs in the shape of a human foot or sandal.

The archaeological community has accepted Pepper's interpretation that the planks in Room 33 formed a floor, without reservation. Yet, when considering that wood altar components have been identified in Pueblo Bonito and Chetro Ketl (Pepper, 1920; Vivian et al., 1978), the notion raised here is that Pepper's interpretation may be erroneous. A plausible alternative explanation is that these planks are actually retired altar pieces. Pepper's description is sufficiently vague that it is essentially impossible to evaluate them in relation to altar fragments found in Room 93 of Chetro Ketl, where many shaped wood pieces were found lying flat upon the floor. Among these are carefully shaped, straight-sided wood slats. Whether or not they share the same characteristics as the wood planks in Room 33 is immaterial. In their analysis of crafted wood from Chaco Canyon, Vivian and colleagues (1978:41) advise that wood altar components are variable in Puebloan groups. They then go on to describe ethnographic evidence concerning crafted planks used in flat screens or as components of slat altars. In the latter case, such planks "when set in an upright position, help to form a curtain for the ritual stage…" Moreover, when referring to an illustration provided in Stevenson (1904: Pl. CXXVI), Vivian's group (1978:41) remark "Several Zuni altars are also pictured with decorated planks or boards extending across the ceiling height above the altar." Although it is impossible to evaluate whether the floor or altar component explanation is accurate, the second case is certainly consistent with Mills' (2008; 2015) interpretation that many of the objects deposited in Room 33 entail ritual retirement. Although several fragments in Room 93 are painted, a salient point is that Pepper (1920:158) did not realise that plant mold obscured painted decorations on a shaped wood slab from Room 32 until it was cleaned at the American Museum of Natural History after the 1896 field season. Since he seems not to have accessioned any boards from Room 33, it cannot be discounted that designs on these boards also were obscured by mold that developed within that room's equally wet environment.

Vivian and colleagues (1978:60) also note that the retirement of ritual objects may occur upon the death of the last person with knowledge of a given ritual, in which case they may be "buried, sealed in walls or jars, sealed up in a room..." The association of possible ritually retired altar slats with primary burial deposits in the Room 33 crypt is thus a particularly intriguing prospect. The retirement of altar planks upon the death of the person, possibly Burial 10, with ritual knowledge is consistent with the timing of elaboration of Chacoan ritual expression, and perhaps the "forgetting" (Mills, 2008) of certain pre-Phenomenon concepts through a process in which memories are intentionally deconstructed and transformed.

12.4 House Society at Wallace Ruin: Pueblo II

12.4.1 ARCHITECTURE

Although Pueblo Bonito and Wallace Ruin are monumental buildings of public architecture, both are suitable for evaluation in terms of a house society since each contains at least one component having evidence of domestic and ritual activities. However, the plan and scale of the mid-11th century building at Wallace Ruin is more consistent with the second configuration of a Chaco great house. In contrast to interpretations of Old Bonito as a domicile, whether the first occupiers of Old Wallace were individual traders, missionaries or a family group or groups is unknown.

However, the South Suite of the Phase 3 West Arm is undoubtedly a Pueblo II domestic space. The presence of infant and child primary burials on or under the floors of Rooms 18a and 19b indicate that at least one family occupied the expanded great house. Potentially, the Pueblo II primary burials in the extramural midden are related to this group or another house society established in the unexcavated part of the great house.

12.4.2 ORIGINS

There are no MVR architectural or material culture precedents for Old Wallace in the Lakeview Locality or within the MVR. Although Wilshusen and Van Dyke postulate an AD 800s connection between McPhee Village and Chaco Canyon, the absence of human remains within the village' rooms (Stodder, 1987) argues against the existence of a formal house society structure. Based on comments made by Mills (2015:263), it seems that there was no Pueblo I precedent for a house society structure in Chaco Canyon either. Instead, similarities between McPhee and Chaco might simply represent the *habitus* of this putative group as they reproduced their way of doing things, regardless of where they lived and independent of a considered social structure dynamic.

In distinct contrast, Mills (2015:263) concludes that the anomalous depositional history involving bodies and ritual items within the two burial clusters of Pueblo Bonito provides the most compelling evidence for the existence of house society social structure in Chaco Canyon. Possibly, other such groups inhabited great houses that are unexcavated, but none of those excavated have the range or scale of depositional contexts that irrefutably point to the presence of a house society. In addition, their location within the foremost Chaco Canyon great house, along with their scale of expression by number of burials and wealth of material culture, also positions them as the prime house societies of the Chaco Phenomenon. Thus, in terms of chronology and consequence, these two Bonitian house societies are the most likely candidates for *first-principle origins* of house societies at Wallace Ruin, the MVR and the MSJR.

By the time of the construction of Old Wallace in the mid-1000s, the MVR had experienced significant population growth as, presumably, descendants of its Pueblo I emigrants and immigrants with no historical ties to the MVR relocated from communities located south of the San Juan River. This period is concurrent with earliest manifestations of the Phenomenon/regional system centred at Chaco Canyon. Whether the builders or occupiers of Old Wallace had a historical connection to McPhee Village or any other Pueblo I MVR community is unknown. The founders of Old Wallace could not have come from Salmon or Aztec Ruins since it predates their construction by several decades.

There is no doubt that Wallace is a Chacoan great house, built by individuals with advanced knowledge of Chaco architectural techniques, or what Van Dyke (1999:481) refers to as “directed construction.” The technological “know-how” for erecting the three-storey masonry building of Old Wallace was not present in the MVR in the mid-1000s or during the 1100s expansion of the building. In addition, although neither of the Phase 3 (c. AD 1120) elevated kivas at Wallace Ruin is professionally excavated, Chacoan technological features on the exterior wall of the eastern kiva were revealed during (historic) looting. The exposure of otherwise hidden Chacoan architectural features also took place during research excavations of court kivas at Aztec West, from which Windes (2014) concludes that individuals with first-hand knowledge of Chacoan building technology built these structures.

Although the West Arm of Wallace contains a small residential component, this building is not a domestic, vernacular structure. From inception, this small, multi-storey Chacoan great house functioned as an outlying component of a developing regional system that did not yet include Salmon Ruin or Aztec Ruin. Whether builders of Chaco Outliers took up residence, moved along to construct another great house, or returned to Chaco Canyon is unknown (Van Dyke,1999:481-2). The most plausible explanation is that at least some or all of the individuals who resided in Old Wallace had a direct connection to Chaco Canyon. This is in line with the assumptions of Snow and LeBlanc (2015), who consider the spread of the Chaco system in terms of the installation of elites in far-flung great houses who shared a biological connection. Possibly, locals helped erect the core great house under the supervision of a non-kin group of architectural specialists. If so, it is unknown if any of these indigenous individuals then moved into Wallace Ruin and, through time, became inculcated with Phenomenon ideas and ways.

On the other hand, the Phase 3 and extension of the great house (i.e., Wallace Ruin) and the construction of the Lakeview Group great houses of Ida Jean Pueblo and Haynie Ruin are roughly concurrent or shortly follow (post-date) the establishment of Aztec Ruin (MSJR) and the shift of socio-ritual power from Chaco Canyon to the Aztec locality. Whether the expansion of the great house into its current footprint involved an influx of builder/occupiers from Aztec or other Chacoan sites is unknown. Alternatively, it is entirely possible that original immigrants and/or their descendants had intermarried with the local population during the 70 or so years since the founding of Old Wallace and this construction episode. However, kinship distinctions between Chaco/MSJR immigrants and MVR peoples having an interest in Wallace Ruin may not have existed; possibly, these individuals were members of related lineage groups, or they recognised those links, even if just in terms of distant *first-principle origins*.

12.4.3 ANCESTORS

12.4.3.1 *Scale: Number and Timescale*

Pueblo II primary burial deposits within the great house are few, with just five discovered in the fully excavated West Arm. Room 18 contains two primary burial deposits, though in different MCT, whereas the other three are in a single room each. Three individuals are within the South Suite domicile, one is in the storage room immediately south of the North Suite, and the fifth is in an Old Bonito upper-storey residential space.

None of these remains are dated with radiocarbon assays, and only the child in Room 18a is accompanied by non-perishable grave goods consisting of two large sherds from Late Pueblo II times. The earliest depositions at Old Bonito took place soon after construction, but just one Old Wallace room (15b) contains a primary burial deposit. However, stratification evidence dates this infant to c. AD 1120-1150, so after great house expansion. The remaining individuals are in Phase 3 rooms, which means they died within this same interval. An adult calcaneus in lower fill of Room 25a is the only isolated adult or older adolescent bone in an Old Wallace room that is not from a disturbed Pueblo III provenience. The natural appearance of its surface does not indicate wear from handling during reverencing activities.

12.4.2 *Age and Sex*

Four intramural primary burials are infants, and one is a young child. Each infant is either a late term foetus/neonate or six to nine months of age. All are of unknown sex.

12.4.4 INALIENABLE HEIRLOOMS

12.4.4.1 *Altars*

The inalienable heirlooms in Pueblo II proveniences are similar to items observed in Pueblo altars. Most of those depicted in Figure 12.2 are from Old Wallace habitation Rooms 14a and 15a and were discarded prior to the Phase 3 construction; their ritual retirement in cultural refuse strata also predates the deposition of iLink 366 in Room 15b. Two rectangular modelled, polished but unfired clay objects containing linear arrangements of small holes, probably pierced by a twig, merit special mention. Such objects, known as “feather holders,” are presumed to hold feathers or prayer sticks during ritual occasions, in similar vein to the alignment of eagle feathers that forms the backdrop of a Hano Winter Solstice altar depicted above in Figure 12.1. In her analysis of Ancestral Pueblo feather holders, Sullivan (2004) determined that these objects are unique to Pueblo Bonito and the two Chaco outliers of Chimney Rock (CO) and Wallace Ruin. Of note, both of those from Wallace Ruin are associated with other items suggestive of altars. Feather holder 14.126 is within lower fill (Stratum 12) of Room 14a, near a jet (mineralised coal) ring fragment and slightly below the discovered location of the Chaco B/w human effigy fragment. Feather holder 19.100 is just above the floor of Phase 3 Room 19a and is overlain by Late Pueblo II cultural deposits. It is associated with a circular shaped stone crafted from limestone, the clay lump with corncob impressions, and a *Glycymeris* sp. shell bracelet fragment that is probably of Hohokam origin (B. Bradley, pers. comm. 2017);

this farming culture occupied what is now central-south Arizona. Thus, these clusters of inalienable objects in both rooms are consistent with the retirement of Old Wallace and Late Pueblo II great house altar components.

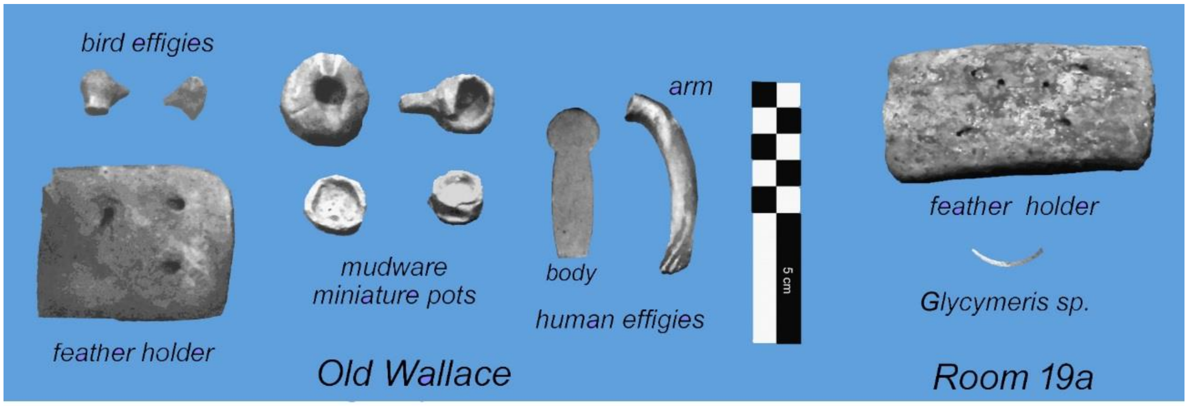


Fig.12.2: Inalienable heirlooms from Wallace Ruin: Pueblo II proveniences.

Other items include a concentration of shaped and smoothed clay chunks in Room 15a that were probably from a dismantled altar (Bradley, 1988:18). Figure 12.3 compiles photographs of three chunks with alignments of awl-prick holes that penetrate the surface (punctations). Two have zigzag motifs and the third has a stick-figure dancing human with turkey-track feet.

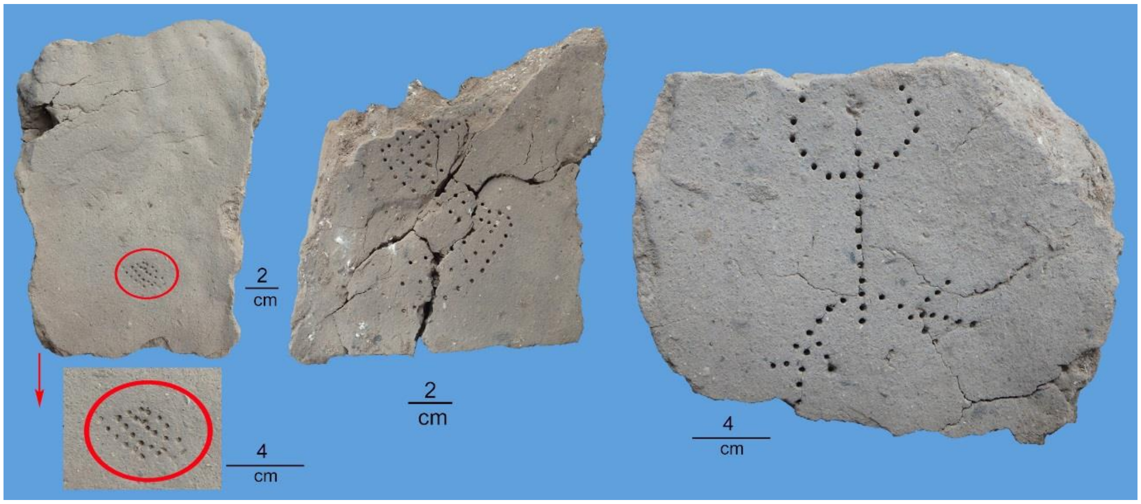


Fig. 12.3: Probable clay chunk altar components with "punctated" designs. Pueblo II, Room 15a of Wallace Ruin. Photograph by Bruce Bradley.

Other chunks have parallel *equisetum* impressions suggestive of bundled reeds; this herbaceous plant grows in aqueous environments. Rolled-up reed mats, or reed cylinders, are present at Pueblo Bonito and in Chacoan deposits at Aztec West and Salmon Ruin (Webster, 2008:181, Fig. 9.9). In contrast to Pueblo Bonito (Pepper, 1920:70), reeds were not a building fabric at Wallace Ruin. In addition to these, a clay chunk with corncob impressions is within lower fill of Room 19a, and Room 14a contains modelled clay chunks with no impressions.

12.4.4.2 *Iconography*

Representations of the human body consist of an arm fragment from a Chaco Black-on-white human effigy jar, a ware made only in Chaco Canyon, and an abstract representation of the human form created from sandstone. The punctated clay altar fragment with the dancing human with turkey track feet motif references both humans and animals. The chunk with the corncob impression may have alluded to human beings in accordance with the PEOPLE ARE CORN metaphor that was, and is, widespread throughout indigenous maize-reliant groups of North and South America (Washburn, 2012). The fundamental notion is that the human life cycle equates to corn plant growth. Lakoff and Johnson (1980:33) hold that ontological metaphors, in which a material object is described as a person, “allows us to comprehend a wide variety of experiences with nonhuman entities in terms of motivation, characteristics and activities.”

The only artefacts that are definitely associated with a Pueblo II intramural burial have no discernible connotations of ritual use. The two sherds from the Room 18a child (HR 9) are from vessels built by skilled potters, and the basic layout of the white ware sherd decoration is the work of an experienced painter (see Appendix B: Fig. B.14). However, naïve additions to the design are consistent with the developmental stage of a young child (Crown, 2002).

12.5 House Society at Wallace Ruin: Pueblo III

12.5.1 ARCHITECTURE

There was no residential use of Wallace Ruin during its post-AD 1180 use, whether domestic or otherwise. The construction of a dividing wall within the upper-storey Room 27a is the only certain Pueblo III architectural modification to a Phase 3, West Arm room that is unrelated to kiva traits. The configuration and technological attributes of the inserted Mesa Verde style Kiva 1 are consistent with Pueblo III MVR traits. Modifications to Old Wallace rooms to create Kivas 3 and 4 are consistent with those described for Mesa Verde phase intramural kivas at Bluff Great House (Cameron, 2008:256). In Bradley's view (pers. comm, 2014), the insertion of Kiva 1 and the selection of rooms for intramural kiva modifications represents deliberate efforts to connect these Pueblo III ritual spaces with the western Pueblo II elevated kiva; presumably, this latter structure overlies the original, Old Wallace, kiva, and thus signals the intent to maintain an ancestral-ritual association.

The 18a/19a doorway in the east wall of Room 18a was blocked at some point to create a compartment on the 18a side. As can be seen in the Figure 12.4 photograph, all masonry surfaces have a smooth, finished appearance. This space may have functioned as an altar or a niche for storing ceremonial items. The timing of this modification is unknown other than it was after the discard of Old Wallace altar components in Room 19a. The salient point is that regardless of when this change occurred, this feature was fully accessible during the mortuary use of the West Arm, up to the time of structure collapse some years after the final abandonment of Wallace Ruin.

Fig.12.4: Possible altar in the remodelled 18a doorway.

12.5.2 ORIGINS

The case for Bonitian *first-principle origins* and the Pueblo III use of Wallace Ruin is addressed in this chapter's Discussion section, as is the potential for house societies at Mitchell Springs and Yellow Jacket. Whether putative *prior house origins* of the Pueblo III users of Wallace Ruin relate to the Pueblo II occupation of this great house, one of the other Lakeview Group great houses, or another Pueblo II or Pueblo III MVR residence or residences is unknown. The most logistically plausible circumstance is that most of the Pueblo III individuals, either deceased or buriers, came from the Mitchell Springs Locality; this was the closest Pueblo III community from the late AD 1100s to c. AD 1240 though roughly 10 km distant. However, an intense fire destroyed the Pueblo A great house at about AD 1230; this small, two-storey great house of 22 surface rooms was seemingly inhabited by just two families. Dove (2014) reports that no more than 20 families, or 40-60 people (Dove, 2009:128), lived in this community during the last phase of its occupation. The methods used to determine these population estimates are not described. On the other hand, if based on the number of primary burials located, the deposition of Mitchell Springs dead at Wallace Ruin or another Lakeview Group great house could skew this result. It may be coincidental, but the apparent timings of the end of the mortuary use of the West Arm and the occupation of the entire Mitchell Springs Locality are roughly concurrent.

12.5.3 ANCESTORS

12.5.3.1 *Scale: Number and Timescale*

To reprise key findings from Chapter 6, a minimum of 32 individuals are in a Pueblo III room MCT. *In situ* and taphonomic evidence indicates that the primary deposit locus for all but three (subfloor MCT) individuals involved a floor or use surface. Six ground-storey rooms contain evidence of primary burial deposits. These rooms constitute a cluster that includes the South Suite, the adjacent (north) Room 17a, and two rooms in the Annex. Stratigraphic sequencing and AMS dates for five individuals, including one re-deposited iLink in the North Suite, provide evidence of intermittent primary burial depositions. At most, these events occurred between AD 1180 and 1220. There is no evidence of secondary burial practices. The re-deposit of skeletonised remains in the North Suite represents a response to the post-mortuary disturbance of South Suite primary burial deposits; potentially, some of the North Suite skeletal elements came from disturbed depositions in unexcavated rooms. Finally, the absence of the cranium of HR 4 can be explained by circumstances other than removal of the head for ancestor veneration rites.

12.5.3.2 *Age and Sex*

All age groups are represented, as are both sexes. The age-sex structure is generally consistent with the demographic profile of the MVR comparative population, which approximates the pattern observed in developing societies. There is a paucity of older individuals. However, this apparent dearth may be a by-product of the skeletal damage and disarray caused by the carnivore intrusion into the South Suite, and possibly other rooms.

12.5.4 INALIENABLE HEIRLOOMS

12.5.4.1 *Altars*

As in the case of the Room 18a niche, other West Arm inalienable heirlooms cannot be attributed specifically to either Late Pueblo II or Pueblo III times. However, it is evident that all would have been accessible to use or view during the Pueblo III Period. Possibly, objects found in floor fall but originally located along the north wall of upper-storey Room 5b of the North Suite may represent the displaced remains of an altar or shrine (Bradley, 1988:19). The heirlooms depicted in Figure 12.4 include a conical sandstone pecked object (Fig.12.4a) that may be a maize deity, or Corn Mother, that rests upon a concentration of masonry stones with attributes differing from slabs representing wall fall. Frisbie (1971:215) reports that such objects from undisturbed contexts are used in Ancestral Pueblo altars by about AD 1000. No human remains were found in a Room 5b provenience. Although bones from Pueblo III disturbed South Suite primary burials were re-deposited on the North Suite's ground-storey floors, a direct connection to this event cannot be made since the temporal period of this possible altar is indeterminate. A cluster of ground sandstone artefacts on the floor of the adjacent Room 6a included a stone slab with a red spot painted on one face (Bradley, 1988:23). Whether this assemblage, which is possibly a shrine, predates or is contemporary with the re-depositions of carnivore-disturbed human remains deposited in this room is unknown. A second stone slab with a red paint spot may have served as a Kiva 1 wall niche cover (Ibid.).

Room 30 of the Annex contains the largest concentration of inalienable objects in a Pueblo III provenience, including the other three items in Figure 12.4. The time of fabrication of the two siltstone *tchamahias* (Fig.12.4b) and a sandal-shaped sandstone slab (Fig. 12.4d) is indeterminate. However, the McElmo B/w human effigy jar (Fig. 12.4c) dates to Pueblo II times. Bradley (2010:47) interprets these objects as Pueblo III ritual discard. The *tchamahias* are on the same use surface as HR 17 but beyond the mortuary locus. The effigy jar and sandal-shaped slab are in the overlying cultural discard fill unit (Stratum 3).

Fig.12.5: Inalienable heirlooms from Wallace Ruin Pueblo III proveniences: "Corn Mother"; b) tchamahias; c) effigy jar (PII); d) sandal-shaped slab.

12.5.4.2 Iconography

Although they may have been altar components, the effigy jar and shaped sandstone slab are also iconographic representations. Seated anthropomorphic vessels with modelled limbs and gender indicators, and with realistic painted facial features, hair, and clothing, are rare (McKenna, 2016). Although a few such vessels have been found in the MVR, the majority are from Chaco Canyon or in Chacoan strata at Salmon Ruin and Aztec West. Although the arm fragment in Room 15b is from an effigy jar built in Chaco Canyon, the effigy jar from Annex Room 30 was manufactured locally, or at least in the NSJR since an Aztec Ruin origin has yet to be excluded. Regardless of place of origin, all date to the Chaco florescence between AD 1050-1150 (Bradley, 2010a; Franklin and Reed, 2016:11). Rather than personal possessions or entailing the generic reference to forebears exemplified by the Old Wallace sandstone “body” effigy (Fig.12.2), the detailed depiction of facial features suggest that these vessel effigies were icons that depicted a specific individual, venerated ancestors, or a deity (Franklin and Reed, 2016:13).

Residue analyses suggest that the Wallace anthropomorphic effigy jar was used for ceremonial libations (Logan and Cummings, 2014), and its worn-down surface, apparently from rubbing, indicates prolonged use. The Mancos Black-on-white canteen (AD 1050-1150) deposited with HR 11 (AD 1180-1220) would have been several if not many decades old by his death. Although it is not evidently an iconographic figure, this “water holding” vessel, which also dates to Chaco Phenomenon times, may have been used for communal ceremonial libations and then ritually retired upon the demise of HR 11; potentially, its interment with him was related to rituals specific to his manner of death. Alternatively, it may have been a personal heirloom.

12.6 Findings

As interpreted by Mills (2015), house society social organisation at Pueblo Bonito was structured by practices related to a specific “memory regime” centred around ancestor veneration. She holds that such practices are evidenced by a three-fold material expression. These variables comprise the occurrence of numerous primary burials (and possible secondary re-depositions of bones), the use of specific household rooms, and associated deposits of inalienable heirlooms.

12.6.1 PUEBLO II HOUSE SOCIETY AT WALLACE RUIN

There are some indications of Pueblo II house society organisation at Old Wallace during the timespan in which it was the sole great house at the Lakeview Locality. Building technology and a Chaco B/w inalienable heirloom vessel fragment support the finding that, if present, both *prior-house* and *first-principle* connections were established in Phenomenon core site(s) at Chaco Canyon. The evidence for house society presence becomes more certain with Phases 3/3.5 building expansion and the creation of residential quarters indisputably inhabited by one or more families. On the other hand, this does not necessarily imply a house society structured along the lines of those represented in Old Bonito rooms. Although the Wallace great house contains primary burials deposited between c. AD 1120-1150, they are low in number (5) and are not concentrated in a specific household room; just three are located within the South Suite domicile. In addition, most of the inalienable heirlooms are in Old Wallace strata that predate these primary burials, as well as being in entirely different rooms.

Setting aside that roughly two-thirds of the building is unexcavated, the Pueblo II demographic profile suggests alternative reasons for their presence within great house rooms. Even though infants and young children can be included in ancestor veneration notions, other interpretations come to the fore when the very young constitute the entire burial population. As in the West Cluster, they are recognised as “ancestors” only in association with sexually mature adolescents and adults. On the other hand, the representativeness of Pueblo II mortuary evidence is unknown. Potentially, future excavations within other Old Wallace rooms, the central room block and the East Arm of Wallace Ruin may lead to the identification of a Pueblo II mortuary program more in keeping with either West or North Cluster demography.

Better evidence for the structuring of house society ways is provided in the inalienable heirlooms that served as Pueblo II altar components. The arm from the Chaco B/w human effigy jar points to ancestor veneration rites; however, whether such concerns received a disproportionate emphasis is also open to question. In Tewa and Hopi Pueblo symbolism, the zigzag motif represents lightning (Parsons, 1939:391; 396), and, ultimately, rainfall. Among Puebloans, turkey feathers and turkey tracks are associated with the spirits of the dead who rise as clouds and return as rainfall (Ibid.275). However, such ideas were pervasive in the Ancestral Pueblo world prior to the Chaco Phenomenon (Schaafsma, 1986:27-28). Therefore, these iconographic images are more suggestive of pervasive Ancestral Pueblo cosmological “cult of the dead” notions, in which the deceased are recalled in abstract terms as opposed to associations that allude to specific forebears. Another possibility is that these Pueblo II altar components signal rites focused upon fertility and interactions with the natural world rather than notions about death.

All in all, there is a good case for Chacoan connections and the presence of house society social organisation during the Pueblo II occupation of Wallace Ruin. On the other hand, these three lines of inquiry do not indicate social structuring in line with the Bonito Cluster memory regime. Rather, the more probable explanation is that *prior-house* origins involved a non-Cluster, Chaco Canyon house society in which ancestral concerns existed but not to the specification or degree expressed within these Bonitian house societies.

12.6.2 PUEBLO III HOUSE SOCIETY AT WALLACE RUIN

In respect to the variables identified by Mills, there is compelling evidence for a post-AD 1180 house society structure at Wallace Ruin in which ancestor veneration was highly emphasised. However, in contrast to the prime Bonitian house societies, there was no residential occupation, domestic or otherwise, during this intermittent re-use of the great house. One possibility is that these individuals were residents of another MVR great house that was unavailable for their use. As at Mitchell Spring's Pueblo A and at Salmon Ruin, their ancestral "house society" building may have been converted for use as a habitation. Alternatively, regardless of domicile locations, these individuals may have considered that the rites performed to establish or re-establish a group identity needed to be conducted in a safe place, away from the observations of others who may have construed such goings on as threatening to social and cosmological order (Rowlands, 2007:66). Memories or received knowledge of the violent acts associated with the breakdown of the Chaco regional system may have induced participants to hide actions involving an expressed connection to Phenomenon practices, even when these ceremonies also entailed such MVR notions as the Pueblo III "key-hole" kiva form. On the other hand, knowledge of this re-use could have been widely known but not construed as particularly meaningful. Ultimately, even though the residential community, or communities, of the individuals who made use of Wallace Ruin's floors for Pueblo III depositions is unknown, it is reasonable to conclude that this group drew upon social, and perhaps personal, memory of the high-visibility mortuary practices established in Pueblo Bonito burial clusters. The question then, is what contemporary or *prior-origin* house society(ies) might have structured these individuals' notions about ways to venerate ancestors?

12.6.2.1 *Evidence for MVR House Societies*

The house society notion has yet to be investigated in MVR communities, including two with potential participants in the ritual and mortuary use of Wallace Ruin after AD 1180. Unfortunately, a detailed investigation of such a possibility is beyond the scope of this investigation, in large measure because the essential information is not available or is unpublished. Even so, some preliminary observations are possible.

In several ways, Mitchell Springs Ruins offers the best prospect for *prior-house* origins for the Wallace Ruin depositions. Besides being the closest Pueblo III community, it has two Chacoan great houses and evidence of Pueblo III domiciles, which includes one or two residences within the Pueblo A great house. Chaco B/w cylinder jar fragments, from a vessel form identified by Mills (2015) as a type of Pueblo Bonito inalienable heirloom, connect this site to Chaco Canyon during Pueblo II times. The presence of these fragments on the floor of the abandoned great kiva (Dove and Dove, 2009:19) suggests its ritual retirement at the end of the Pueblo II Period. A fragmentary Early Pueblo II (Cortancos) human effigy vessel from the collapsed upper-storey Room 18 of Pueblo A and parts of other iconographic human effigies evidence ancestor veneration rituals (Fourcornersresearch.com, 2016). It is not clear if the broken human effigy vessel(s) are associated with Pueblo II or Pueblo III deposits. Thus, architecture and some of the inalienable heirlooms are indicative of connection to a Chacoan "community of practice." On the other hand, as documented in Chapters 7 and 8, there is no skeletal evidence to suggest that Mitchell's MCT choices drew upon notions expressed in Bonito's burial clusters. Complicating factors that hinder research on house societies at Mitchell Springs include the razing of the Pueblo B great house (two stories, 25-30 ground storey rooms) by looters and the absence of research excavations in Pueblo III domiciles (Dove, 2014; Dove et al., 1997; Wheeler Smith, 2009).

Further afield, Chacoan great houses situated within Pueblo III communities are either unexcavated (Mud Springs, Yellow Jacket, Yucca House) or have not been evaluated (Lowry Ruin) in terms of this intermediate form of social organisation. There is no Pueblo III community near Escalante Ruin. Of these, the only comprehensively excavated residential community is within the Yellow Jacket Locality, some 18 km from Wallace Ruin, where symbolic concepts are expressed in architectural terms (Mobley-Tanaka, 1997; 2005). However, these material metaphors do not specifically reference Chacoan building technology or ideas. No 5MT1 or 5MT3 primary burial deposit has Chaco B/w pottery (Karhu, 2000: App. B). Based on ceramic seriation, Mark Mitchell (accessed 10.10.2016) identifies a Pueblo II occupation at 5MT1 between AD 1060 and 1140, a prolonged hiatus, and then a Pueblo III occupation from AD 1225 to 1280. The nearby 5MT3, occupied throughout this timespan, has no Chacoan material culture evidence apart from its proximity to the, possibly Chacoan, YJP great house at 5MT5 (Wilshusen and Mobley-Tanaka, 2005). To reprise evidence presented previously, although 5MT3 surface rooms contain 22 primary burial deposits, none are on a floor or use surface. Excavations within the residential section of 5MT5 by Crow Canyon Archaeological Center were restricted to extramural middens and wall exposure (Kuckelman, 2003b). No Chaco Black-on-white sherds were found in any site provenience; San Juan Basin imports are comparatively rare, and all non-utilitarian items are beads and ornaments representative of personal possessions (Ortman, 2003).

12.6.3 *Evidence for MSJR House Societies*

Given the ebb and flow between the sub-regions of the NSJR, it is possible that Pueblo III users of Wallace Ruin grew up in a MSJR great house community before relocating to the MVR. Archaeologists have yet to consider the possibility of house society social organisation at Aztec Ruin, though there are grounds to speculate the presence of at least one or two. Webster (2008:187) does not evaluate the presence of house societies per se at Salmon Ruin; however, she suggests that a cluster of rooms within the northwest section of Salmon Ruin served as a multigenerational mortuary locus for members of a lineage or (religious) society, beginning with immigrants from Chaco Canyon. However, if such house society social organisation was present at either of these great houses, which is plausible, their memory regimes in respect to mortuary location choices and postural arrangement are dissimilar to those of Pueblo Bonito’s Clusters, including during their Chacoan occupations. From this admittedly incomplete evidence, there are no indications that a house society located beyond Chaco Canyon was involved in the structuring of mortuary practices and material culture associated with the use of Wallace Ruin during Pueblo III times.

12.6.3 PUEBLO BONITO CLUSTER HOUSE SOCIETY: REDUX

Wallace Ruin is the only excavated NSJR site in which MCT choices mirror those observed in the North and West Clusters of Pueblo Bonito. Possibly this similarity represents someone's, or some group's, recollection of such practices, either through a personal memory or as received knowledge emanating from an eyewitness account, formal oral tradition, or even hearsay. Yet, material evidence integral to the wider "community of practice" evidenced at Pueblo Bonito and the Pueblo III use of Wallace Ruin testifies to a breadth of shared concepts integral to a pronounced, multi-component ancestor reverence scheme rather than a comparatively superficial likeness based on mortuary location choice alone. Possibly, this correspondence may have involved all three Lakeview Group great house sites. Like Pueblo Bonito, most of the P3WR primary depositions are in a room floor MCT and within an accessible open space in which mourners could sit or move about. Such mortuary circumstances are consistent with interpretations of the ancestor veneration practices associated with Inca open sepulchres, which permitted continued interactions with the biologically deceased (Isbell, 1997).

Ethnographic and historic accounts make clear that although Greater Southwest and Mesoamerican cosmologies are diverse, a pervasive theme involves recourse to ancestors who assist in rainmaking for maize agriculture. Multiple lines of evidence suggest that the conflation of ancestors with rainfall was a widespread notion in its archaeological cultures (Plog, 2012; Shaafsma, 1999). However, as described in Hopi and Tewa ethnographic accounts, ancestors are referred to in non-specific terms. In fact, the expectation is that the decedent is not to be mentioned beyond the fourth day so the individual can continue on the pathway to the ancestors. Rather, the explicit notion is that the dead are to be put away, out of view and out of thought, or at least expressly so. In terms of an archaeological community, the Pueblo III room fill and subfloor MCT choices at Yellow Jacket Hamlet suggest that the intent was to forget the dead, or again, at least to not memorialise them overtly.

Mills (2015) does not evaluate the phenomenological potential of mortuary contexts within open surface rooms, in which there is the potential for observation or interaction until the remains become obscured by fill. Yet, this factor is important in symbolic and logistical terms: bodies and accompaniments are given but not lost, stored though possibly used. So, for instance, items deposited within the vicinity of a specific body could still have retained its identity as a house valuable. The perceived value of the mortuary context may not have rested on its continued manipulation, though even that may have been possible. An enwrapped body may even have provided a strong theatrical/emotional tableau or backdrop for accompaniments. Possibly, the enduring power and influence of a primary burial deposit rested on the factor of observability: still viewable, still present, still available for reverencing.

Williams (2006:118-121) discusses the ideas of Halsall (2003) regarding the mnemonic significance of graves, in which buriers deliberately create an “image” that serves as a form of communication, or “text” to be “read” by mourners and remembered as “scenes” afterwards. As stated by Williams (2006:118), “burial rituals, including the choice of clothing for the body and of grave goods, structure, orientation and position, are always a dynamic and innovative ritual display.” These displays are even more memorable when they involve ritual performances intended to heighten emotions (Carver, 2000). Halsall (2003) advises that such displays can provide a source of competition between groups. These researchers evaluate graves in respect to the immediate timescale, so prior to the covering or obscuring of the mortuary locus. However, remembrance is less constrained to a particular performance, text, or emotional experience when a primary burial deposit is situated within a capacious open space that can be fully entered by humans.

Phenomenological factors may have been less important to memory construction in Old Bonito’s small and dark Room 33. However, South Suite rooms at Wallace Ruin would have had much more scope for viewing impact. Even Room 17, accessed through a hatchway, could have allowed for some visual impression as the living would have had room to move around and possibly undertake commemoration events in which body and objects were blessed with corn pollen, for example.

Beck (2007:8-9) suggests that the bones of renowned ancestors may be construed as sacred and imbued with magical power, and thus constitute part of the house's wealth. Mills (2015:256) considers that Bonitian house society members "memorialized those who were buried in crypts by placing objects of memory in and near them and redepositing parts of bodies with those who had been previously interred." From her statement, it appears that she does consider the possibility that Chacoans construed bodies of the deceased as inalienable heirlooms. Yet, this distinction between the human skeleton or individual bones versus material objects as different categories of things reflects an engrained Western perspective (Sofaer, 2006:62). In contrast, in Tewa world view, "all objects which have been used by people are endowed with sacredness because they are associated with the souls and with the sacred past (Ortiz, 1967: 20).

Another example of this non-Western perception is provided in Isbell's *Mummies and Mortuary Monuments* (1997), in which he evaluates the Incan connotation of sacred "living" objects of memory with the founding ancestral mummy of kin-based *ayllu*. This pre-Contact Andean social organisation was essentially equivalent to a house society. Each *ayllu's* ancestral mummy was central to its prestige and wealth; these forebears were curated within an open sepulchre or, in the case of royal mummies, provided with its own house, and paraded during ritual occasions. The concepts of mummy as both ancestral object and *allyu* were so closely associated that its destruction by a rival group effectively eliminated that *allyu*. In similar vein, Beck cites Freedman (1966:139) regarding the significance of ancestors' bones in China and the deleterious effects on a kin-group upon the smashing of bones within the ancestral tomb.

In his study of the threefold cult system of the Mississippian archaeological culture, Knight (1986:677) concludes that a distinct iconic family of sacra provides a cohesive, material expression for each group's particular symbolic identity. At Pueblo Bonito, these sacra would have entailed intermittent depositions of richly accompanied corpses and subsequent deposits of ritual items, to memorialise them. Thus, much of Mills' (2015) case that Bonitians construed the Clusters' remains as venerated ancestors derives from idea that these rooms were perceived as “architectural containers” (Ibid.:259) in which bodies and ritual “objects of memory” (Ibid.:256) shared a common space. However, in such case, deposition within a particular surface room MCT would seemingly make no difference as long as “container” equated with “room”. On the other hand, the evidence suggests some, or probably all corpses were enwrapped with shrouds, feather blankets, or matting before their deposit on a floor/use surface in an open space. The configuration of an extended human form would be retained, thus creating a readily perceived entity that was both body and object, similar to the abstract human body represented in the sandstone heirloom depicted in Figure 10.2. Thus, though Mills does not seem to construe human remains as sacred objects in the sense of things, a plausible argument is that these cadavers, and eventually skeletonised remains, were viewed as objects of memory in the same vein as other sacra for this house society. In such case, Bonitians may have construed these particular remains as both ancestors and “communally owned.”

12.7.1 POST-DEPOSIT INTERACTIONS/OBSERVABILITY

It is not possible to ascertain if physical interactions with the dead deposited upon Wallace Ruin’s floors was an aspect of its Pueblo III mortuary program. Even so, a factor to consider is that these primary burial deposits are in rooms adjacent to the inserted Kiva 1 rather than in the patently more secure ground-storey rooms of the North Suite. Although Room 17 was accessible only through its hatchway, the rooms of the South Suite were readily entered until the disturbance of its primary burial deposits by carnivores prompted their sealing. Perhaps, the close vicinity of these “burial rooms” to Kiva 1 signals a desire that the dead should be nearby, even if interactions were limited to viewing through a doorway.

Two rooms at Old Bonito have deposits of both ritual items and primary burials (Judd, 1954; Pepper, 1909). Those of Room 33 are striking in terms of the number of individuals deposited within a small space and the quantity of exotic items. Post-deposit disturbances suggestive of looting in West Cluster Room 330 mean that the full record of items present originally is unknown; however, the careful arrangement of arrowheads in the shape of a large arrowhead between the flexed lower limbs of Burial 10 is obviously symbolic of some cosmological concern. The undisturbed primary burials at Wallace Ruin are not so richly accompanied as those at Bonito, Salmon's "Bow Priest" (Espinosa, 2006), the "Warrior" of Aztec West (Morris, 1924) or "The Magician" of Ridge Ruin (McGregor, 1943). Regrettably, the scale and nature of the grave goods of HR4 and HR 11 are unknown. Conceivably, the rich projectile point paraphernalia associated with the latter reflects his manner of death rather than any social role held during life. However, it is apparent that the intent behind the intentional post-deposition intrusions into both mortuary contexts focused upon the removal of specific, known items rather than the disturbance of their skeletonised remains. The generally intact condition of their bones indicates that these intrusions did not include an effort to destroy the power of a house by damaging these remains.

12.7.2 VARIATION FROM PUEBLO BONITO CLUSTER HOUSE SOCIETY

The primary burials in Old Bonito rooms are at scale that is singular, in terms of number of individuals involved, richness of accompaniments, and extended postural arrangement. The smaller scale of the P3WR mortuary program may be the product of a much shorter time span, the reduced involvement in exchange networks, and logistical variables involved in the need to transport bodies over a long distance. In terms of the factor of logistics, Toll (2008) makes a significant point regarding perceptions of distance regarding the transport of very large logs, some 75 km (Betancourt et al., 1986:375), to construct the great houses of Chaco Canyon. Such materials were possibly construed as sacred objects owing to human handling and intended function as components of kivas and other ritual spaces. In Toll's words (2008:325), "Long distance for knowing about or believing in something is different from carrying a heavy log. Reasons for carrying the log change the definition of long as well." Whether the transport of construction beams over substantial distances was part of the lived experience of the Wallace buriers is unknown. However, tales of such Chacoan undertakings would no doubt have been part of San Juan Region oral tradition. Potentially, the Pueblo III transport of bodies across the landscape was construed as ritual re-enactments of such journeys.

However, none of these factors explain the distinctive difference in body configuration patterns between Bonito and Wallace Ruin. In terms of the arrangement for floor depositions is unique. A functional explanation in terms of ease of transport is nonsensical. An extended body can be lashed to a ladder or equivalent with relative ease. Even tight flexing would make more logistical sense, as it would concentrate the centre of gravity. Binding in a lateral/flexed arrangement would also avoid the problem of an unbalanced mass, in contrast to the situation in which the semi-flexed knees projected above the body even when lashed to a ladder or litter. On the other hand, although transportation in a USF/S position would add further complications to journey already entailing logistical difficulties, such a configuration would definitely create a distinct visual impression. Of course, bodies could have been in an extended or compact arrangement for transport, with re-configuration occurring only at deposition. Such a possibility makes sense when considering the difficulties of fitting an adult-sized body through a hatchway or a raised-sill doorway.

Assuming so, this implies that the upright knees configuration was exceptionally meaningful as it would have entailed additional manipulation of the body. Moreover, a flexed body could have been deposited in its typical lateral position. Instead, the recurrence of this postural arrangement through time and in different rooms points to the presence of notions that structured this aspect of their mortuary program. At present, there is no evidence for such precedents in the MVR, MSJR, Pueblo Bonito, or any other Chaco Canyon site.

As in their use of Mesa Verde kiva forms, this postural arrangement may have entailed cosmological notions particular to this community of practice, in addition to the Chacoan notions that they were so intent on referencing. However, another possibility is that this configuration relates to an error of memory or a misinterpretation of an oral tradition regarding the posture of Burial 14 of Room 33, the putative founding ancestor of the North Cluster house society. His is the only undisturbed North Cluster skeleton in which the lower limbs were not fully extended. In the words of Pepper (1909:223), “The legs were spread and bent upward, the feet being close together, and resting against the southern wall.” There are no photographs or drawings, so retrospective analysis of this configuration is problematic. Given Marden’s (2011) determination that decomposition occurred in an open space, it is possible that he was in an upright knees postural arrangement at deposition. However, when taking Pepper's measurements of the distance from the north wall to his cranium and a stature estimate of 5'4", the likelihood is that his knees were only moderately flexed; originally askew and with feet together, similar to the configuration of Burial 10 of the West Cluster (Judd, 1954: Pl. 98); #14's stature is estimated using Genoves' corrected formula (del Angel and Cisneros, 2004) and Marden's (2011:693) femoral length of 438 mm. Hence, if the description passed down through the years was along the lines that "his knees were up," the Pueblo III buriers at Wallace Ruin may have been trying to recreate the "described" position of their founding house ancestor.

In conclusion, Bonitians did not incur the logistical impediments faced by buriers regarding long-distance travel to Wallace Ruin. The use of this long-abandoned, distant great house thus accentuates their desire to use either this former Chacoan great house specifically or one that was available. The application of the house society model to the Pueblo III use of Wallace Ruin provides plausible answers to the questions asked at the beginning of this chapter. Rather than drawing upon concurrent or *prior-house* origins, whether at Wallace Ruin or elsewhere, participants in this "community of practice" decided to refer to Bonitian *first-principle* origins and its distinctive memory regime. Aspects of that "group ancestor veneration" program were re-established, or remade, at Wallace Ruin in the early AD 1200s.

The house society model, as exemplified at Pueblo Bonito, also offers insights into the question regarding the preference for floor depositions at Wallace Ruin. At Bonito, the wealth of grave goods, associations with inalienable heirlooms and the demographic profile varied by individual or burial cluster. Yet, the use of a room floor or use surface for primary burial deposits was a constant, throughout the centuries. Possible motivations for a Pueblo III reformulation of a Pueblo Bonito Cluster house society attributes at Wallace are considered in the Conclusions chapter that follows. That assessment also addresses the relation between house society reformulation at Wallace and the intentional disturbance of the HR 4 and HR 11 mortuary contexts.

CHAPTER 13

CONCLUSIONS: REMAKING THE MAZEWAY

13.1 Introduction

From the information presented in this thesis, it is evident that Wallace Ruin is a multi-layered enigma. Its set of interpretive conundrums are aptly represented by the material metaphor of a *matryoshka*, the Russian nesting dolls with a "secret" inside. In this case, the act of getting to this core equates to revealing evidence representative of meaningful actions prompted by the decision of 13th century Ancestral Puebloans to use a distant, abandoned Chacoan great house as a mortuary-ritual facility. In academic culture, Wallace's (1956b) mazeway metaphor underpins reliance upon the use of graphic models that "map" and communicate multiple abstract variables within a concrete and comprehendible format. The image of a maze's twists and turns is also appropriate to this study, as is exemplified by the concoction of hypotheses, datasets, and analytical approaches required to describe, analyse and interpret the Pueblo III mortuary program at Wallace Ruin as well as the subsequent intrusive events that contribute to its understanding.

In this chapter, the pulling together of this evidence in a coherent format proceeds thusly. The first section summarises key information from Wallace Ruin, which has added interpretive complexity owing to post-deposit intrusions into the great house. The second contextualises this information in terms of environmental and cultural factors described in Chapters 2 and 3 and the comparative analyses of specific mortuary attributes presented in Chapters 7 through 10. In the third section, rationales for hypothesis rejection or support are revisited. The fourth section integrates the above information in support of the core argument that the "re-making" of a Chacoan house society provides the most plausible explanation for the re-use of Wallace. The last section considers the contributions to research approaches and future research aims in terms of Wallace, Ancestral Pueblo studies of the San Juan Region, and the field of bioarchaeology.

13.2 Wallace Ruin Synopsis

Key findings that support the conclusion that the Pueblo III use of the West Arm of Wallace Ruin represents a variant Ancestral Pueblo mortuary rite are as follows. To begin with, at least 32 corpses were deposited within a minimum of six ground-storey rooms, for a ratio of 5.3 burials per room. Dating of the mortuary deposits from associated Mesa Verde Black-on-white pottery means that they can only be allocated to the c. AD 1180-1280 timespan, which terminates with the end of the Ancestral Pueblo occupation of the Four Corners. However, radiocarbon dates for five individuals from four rooms narrow this timeframe by more than half, to AD 1180 to 1220, at the earliest and latest. Although the actual period of use may have been even shorter, variation in the AMS results, and stratigraphic evidence in Room 17a, demonstrate that rather than a single episode, primary burial deposits occurred intermittently over several years.

Just 10 individuals are represented by skeletal remains still within their primary deposit context. Among these are HR 4 and HR 11, whose mortuary loci were deliberately disturbed by Ancestral Puebloans. Excluding individuals in Rooms 17 (7 MNI), 29 (2) and 30 (1), element re-association analyses indicate that the four interconnected South Suite rooms contained at least 12 carnivore-disturbed primary burial deposits in addition to *in situ* HR 10 and HR 11. A similar endeavour for the four North Suite rooms yields an MNI of 10 individuals represented by re-deposited isolated skeletal elements. Re-association efforts are hindered by carnivore damage to long bone articular ends; however, left tibia ISE representation for just the four interconnected rooms of each suite (10 South v 8 North) means that there are at least eight individuals not represented by a duplicate element (right antimere).

Bruce Bradley’s proposition that the North Suite’s re-deposited bones came from South Suite primary burial deposits is not confirmed. Instead, the near absence of credible inter-suite re-associations of skeletal elements means that there may be more carnivore-disturbed mortuary loci in unexcavated rooms. Accordingly, the 5.3 ratio of burials per room may not be accurate. That said, Rooms 27a and 30a are the only rooms out of six with evidence of just a single primary burial deposit. The small size of Room 30a, and the decision to deposit HR 17 in the central section of this possible storage room may have precluded further depositions of large-bodied individuals. In contrast, Room 27a is a large habitation room, and the deposit of HR 11 in a subfloor location would have created no logistical impediments to the continued use of its floorspace or even additional subfloor deposits.

By observation or inference, all but four or five of the roomblock's total (Pueblo II and III) of 37 primary burials were deposited upon a floor or use surface. There are no empty subfloor pits. Moreover, bone surface preservation of the disordered elements, including those damaged by carnivores, matches that of *in situ* floor depositions rather than the exfoliating surfaces of bones in subfloor contexts. The preference for a floor location during Pueblo III times is very statistically significant, involving 29 of the 32 P3WR individuals and four of six rooms with a primary burial deposit. Room 17a, with the greatest number of observed mortuary contexts (5), was the least accessible of these since the 17b/17a hatchway is the only built passageway. Moreover, by Pueblo III times, Room 17b was accessible from an external location via its (presumed) roof hatchway only.

Despite the interpretive difficulties arising from extensive skeletal damage and disordering, skeletal condition is sufficient to establish that the P3WR burial population includes all four of the basic age groups and both sexes. This pattern pertains to skeletal representation in both suites and the relatively undisturbed primary burials in Room 17a. Although the number of subfloor burials is very small, the presence of a mature (middle adult) male, an older adult female and an older adolescent female suggests that their deposit in this MCT was not based on a demographic attribute.

All but one, or possibly two, of the suitable Pueblo III individuals in a floor MCT were deposited in a supine, upright knees postural arrangement. The possible necessity to compose bodies in this position after their transport to Wallace, and in the case of Room 17a individuals, their passage through the 17b roof hatchway and then the 17b/17a hatchway, further emphasises the desire for this composition despite the logistical difficulties. The sole exceptions are HR 2, a young infant deposited on the side and, possibly, HR 5. The torso of the latter is supine, but the extensive disordering of the torso bones and undermining of the mortuary locus by burrowing animals means that the original configuration of her lower limbs cannot be established. These individuals are in three rooms, and in the case of Room 17a, on two floors separated by a thick stratum of silty fill.

The use of Wallace's great house rooms during its non-residential utilisation in Pueblo III times has only faint resonances with the mortuary program associated with the Pueblo II residential use of the building. Such scale variables as number of rooms and number of individuals are significantly amplified after AD 1180. In addition to these distinctions in scale variables, differences in demographic patterns are very statistically meaningful in terms of the use of the building. In contrast to P3WR remains, the Pueblo II room depositions demonstrate age grading, as they number only infants and one child. Moreover, the Pueblo II individuals consist of two late term foetuses or neonates, whereas the P3WR population has no individuals of this age. All three floor burials are infants who are either flexed on the side or have lower limbs of indeterminate configuration.

13.3 Wallace Ruin in Context

Schlanger's (1992) description of the Ancestral Pueblo mortuary program as residential in nature is corroborated by the more extensive analyses undertaken in this study. It is appreciated that not all mortuary loci are located even when extensive stripping of a site's extramural zone is undertaken. Admittedly, this evaluation cannot eliminate the possibility that the corpse of a great house or domicile resident was deposited some distance away. However, Pueblo II and III formal burials in isolated locations are rare, and no grouping of Ancestral Pueblo burials that is clearly independent of a residence or settlement has been identified in the Montezuma Valley. Based on the mapped locations of primary burial deposits from several sites (Karhu, 2000: App. I; O'Bryan, 1950: Fig.25; Lister, 1964: Figs. 4&11; Lister, 1966, Figs. 3&9; Martin, 1936: Map 1), MVR extramural mortuary loci are typically no more than 30 or so metres from the household roomblock. On occasion, the deceased were deposited within structure collapse fill in a nearby abandoned building. Whether these individuals formerly resided in or had a specific connection to the abandoned house is unknown. However, this proximity of "old" and "new" houses suggests that this mortuary location choice reflects the desire to inter their dead within the settlement if not the domicile.

Even though Wallace Ruin's Pueblo II mortuary program fits this pattern, the Pueblo III use of the great house does not. As determined from archaeological analyses (B. Bradley, 1988; 2010a) and faunal (Shelley, 1993), it did not have a residential component after c. AD 1150. This study's finding that foetal/neonates are absent from the P3WR population adds support to this interpretation. In addition, there are, currently, no grounds to infer that any Lakeview great house had a permanent occupation after this date. Moreover, multiple studies have established that the eastern Montezuma Valley had no permanent residences after c. AD 1150. Thus, the habitation locales of the Wallace deceased are unknown, as is whether they came from the same residential community. However, the absence of good evidence for primary burial deposits after about AD 1220 is suggestive that the termination of the use of the West Arm corresponds to the abandonment of the Mitchell Springs community, by that time the only settlement with 10 km of Wallace. Possibly, the cessation of the mortuary use of Wallace is related to this move, in which travel distance became a severe logistical impediment, or which entailed risk factors not discernible to current research.

The acquisition of radiocarbon dates for several individuals means that the refined AD 1180-1220 timeframe for the Pueblo III use of Wallace can also be evaluated in terms of the major climatic trends described in Chapter 2. Conditions for maize agriculture were generally favourable throughout the MVR, apart from a short drought between AD 1215-1220 (Van West and Dean, 2000:23). Referring once again to Table 6.4, the five-year probabilities for HR 10 and iLink 326 are such that this dry spell may be concurrent with their dates of death. On the other hand, death during earlier five-year spans are just about as likely for these two and more likely for the other three individuals. Moreover, such brief climatic downturns would not have been uncommon, which gives credence to the notion that this episode, by itself, would not have been perceived as beyond the ordinary. A point of emphasis is that there is a reasonable chance that each of these individuals died before AD 1215.

This particular forty-year timespan is also useful for considering the evidence presented in Chapter 3 in terms of social conditions. Notable patterns include a rising population, influxes of new groups, and the enduring MVR cultural mobility across the landscape (Lipe, 1995; Varien, 1999). Although these suggest potential areas of cultural instability and potential sources of conflict between small groups over good farmland, the social climate does not seem to have been particularly chaotic (Glowacki, 2006:139-140). There may well have been contesting for good farmland, but the very good maize growing conditions in the Lakeview area were not exploited, even as the residential pattern began to shift towards aggregated community centres situated many kilometres west of Wallace. In short, there are no indicators of specific trends or circumstances that instigated the decision to make use of Wallace. These may have entailed very local circumstances, possibly in sites that have not been excavated. Anthony Wallace's (1956a; 1956b; 1966) writings about an influential individual's capacity, or agency, to institute cultural renewal and change predate the action theories of Bourdieu (1977) and Giddens (1984). In accordance with Wallace's accounts of revitalisation movements instigated by such persons, Bradley (2004:257) postulates that such an MVR revitalisation arose c. AD 1240 "through the emergence of a charismatic, visionary, "prophet" figure (possibly even Po-Se-Yemo/Poshai-ani)." This is not to say that this hypothetical figure was involved at Wallace. Rather, it just goes to show that the factor of individual agency can be instrumental in effecting change, or new ways of expressing old ideas, and the difficulty of identifying such situations in the archaeological record.

If the dead came from the residential communities some 10 km from Wallace, the ability to influence buriers to transport the dead to a distant location may have hinged on the circumstance that, under favourable climatic conditions and the absence of intervening canyons, such a walking distance could be traversed in several hours. Based on this researcher's archaeological survey experience in this region, and depending on the age and physical capacity of the buriers, this passage could certainly be accomplished within one day.

The conclusion that the Pueblo III use of the Wallace great house roomblock represents a San Juan Region variant mortuary practice rests upon the compelling empirical evidence presented in Chapter 7. This undertaking comprised comparative, diachronic analyses of the scale variables of roomblocks, rooms and primary burials from 16 great houses and more than 200 domiciles, with findings substantiated through statistical testing. First, great houses and domicile roomblocks were used infrequently in both Pueblo II and III times compared to mortuary locations in the extramural zone. The Pueblo II prevalence of burials and rooms used at Wallace is somewhat higher than such occurrences in MVR or MSJR great houses or domiciles, but it is not sufficient to set it apart. Of all Pueblo II burial populations assessed, only the mortuary use of the two burial clusters of Pueblo Bonito are extremely variant in respect to the scale variable of number of individuals and its correlate individuals per room used. Second, the intensive use of Wallace's rooms in Pueblo III times, by both individuals and rooms, is exceptional compared to local MVR patterns and most MSJR domiciles. However, it is not distinctive from the use of the roomblocks at the MSJR great houses of Aztec Ruin and Salmon Ruin, nor the domiciles of Morris 41. Even so, the Pueblo III mortuary use of Wallace is very different to those great houses in that both are associated with residential occupations whereas the Lakeview Group is not.

The evaluation of SJR room floor contexts presented in Chapter 8 provides even stronger grounds to conclude that the very high prevalence of Pueblo III floor depositions at Wallace represents a variant mortuary practice relative to all sites, including the two MSJR great houses but excepting Pueblo Bonito. As in Chapter 7, this determination is based upon findings pertaining to number of individuals and rooms used, and confirmation of results with statistical testing. Contra Marden (2011), Burials 13 and 14 of Room 33, the purported founding ancestors of the North Cluster house society (Mills, 2015), are deemed as in floor rather than subfloor mortuary contexts. Unfortunately, comparative evidence from the other Lakeview Group members is essentially eliminated by historic and recent vandalism.

In contrast to mortuary variables associated with the use of buildings, the comparative analyses of age and sex representation in SJR sites presented in Chapter 9 establishes that Wallace Ruin's P3WR demography is not variant, with one exception. Rather, as confirmed with statistical assays, its age-sex structure is comparable to those of well-represented skeletal populations and the patterns observed in developing societies. On the other hand, compared to Wallace and these same groups, the adult age grading in Pueblo Bonito's North Cluster individuals is extremely variant. However, as at Wallace, both sexes are present. Even though West Cluster demography is skewed towards adults, the representation of all age groups is more like that of Wallace's P3WR population.

Of the four variant factor analyses, Chapter 10's evaluation of SJR postural arrangement demonstrates that the preference for the supine/upright knees configuration, for individuals in a floor mortuary context, is unique to Wallace Ruin's Pueblo III depositions. The prevalence of the extended position of Bonito's burial room individuals is also highly unusual compared to SJR trends. Statistical tests confirm that both arrangements are notably different to the far more common lateral/flexed or supine/limbs-to-side arrangements, as observed in Wallace's subfloor burials.

13.4 Hypotheses Testing

From the evidence presented in Chapters 7 through 10, Wallace's Pueblo III mortuary program is sufficiently distinct in three of the four assessed variables that it merits identification as a variant San Juan Region mortuary rite. A crucial point is that assays of inter-site, or group, differences per three independent variables (roomblocks, rooms and primary burials) confirms that this difference is statistically very meaningful. The non-residential aspect of this program is also a clear departure from the conservatism of Ancestral Pueblo communities of practice in terms of preference for deposit within or near the residence. Three explanations have been advanced to explain observed variations. This section revisits the evidence used to test three hypotheses and to support the thesis that the house society model provides the most plausible explanation for the Pueblo III use of Wallace Ruin.

13.4.1 CHACOAN REVITALISATION HYPOTHESIS

Bruce Bradley's hypothesis that the post AD 1180 use of Wallace is associated with a pan-regional socio-religious revival that drew upon Pueblo II Chaco Phenomenon metaphorical concepts is refuted on three grounds. The first is that his postulated date of onset c. AD 1240 post-dates the PIII mortuary use of the West Arm by several decades. Radiocarbon dates suggest that such deposition events may have begun in the late 1100s, with cessation of West Arm use for primary burial deposits by AD 1220. The premise that this revitalisation entailed a pan-regional movement that specifically included the renewed use of Aztec Ruin and Salmon Ruin for mortuary purposes is also rejected owing to recent re-interpretations (Reed, 2008b). As it currently stands, Pueblo III burials within their rooms are associated with persistent residential occupations following the collapse of the Chaco Phenomenon c. AD 1150. That less than half of the assessed MVR and MSJR great houses have a primary burial in a room MCT provides a further rationale for the rejection of this hypothesis. The third point is that, in contrast to Pueblo Bonito and Wallace Ruin, very few Pueblo III individuals from these two satellite great houses are in a room floor mortuary context.

13.4.2 SOCIO-NATURAL HYPOTHESIS

The radiocarbon dates from Wallace's Pueblo III burials are consistent with the AD 1200-1240 temporal component of the Socio-Natural Hypothesis, the notion based on Glowacki's (2006: 139-143) identification of an Eastern Expansion involving rising population and moderate social instability. However, the possibility that in-migrations of peoples from beyond the Mesa Verde Region prompted the Pueblo III mortuary and ritual use of Wallace Ruin to establish land tenure claims for nearby fertile fields is not sustained by archaeological evidence. There are no reports of Mesa Verde Black-on-white sherds in a site of any type, other than at Lakeview Group great houses, none of which have yielded evidence of a residential use after AD 1150. Furthermore, although the actual duration of the P3WR mortuary program is unknown, it is debateable whether the intermittent deposit of so many individuals would have been necessary to establish a claim to lands within this locality.

That said, the experience of HR 11, who succumbed to injuries incurred during the second of two acts of violence, and, possibly, HR 3's facial damage may be harbingers of hostilities on a small scale. On the other hand, this adolescent's wounds may represent an accidental injury. An interesting point is that their AMS dates are equivalent. However, this does not necessarily mean that these two, deposited in different rooms and mortuary location types, even died within the same five-year probability interval. The wounds of HR 11 are so unusual in the archaeological record that it is impossible to identify a specific probable factor. It may be related to rising social tensions, but whether these operated at the level of a group, or reflect inter-personal hostility is indeterminate. The safer statement is that based on regional trends, during this timeframe travel to Wallace across many kilometres to perform rituals or to transport the dead seemingly did not entail an enhanced risk of attack, or at least not to a level discernible in the archaeological record.

Essentially, these two hypotheses are two sides of the same coin. Each looks to evidence of social perturbances that prompt recollections of times and concepts of historical or symbolic meaning, whether expressed through architecture, ceramic styles or the deposition of the dead. Thus, their proposed timeframes provide the primary evidentiary distinction. The Chaco Revival hypothesis looks to motivations that are explicitly religious: the rise of a competing belief system. The Socio-Natural hypothesis considers evidence in terms of socio-economic competition during a notable population influx. Each involves a renewed emphasis on symbolic concepts, whether of an intrinsic nature, and thus diffuse notions pertaining to socio-economic power and control, or as means to establish a claim to specific material resources. Both provide plausible explanations for the return to Wallace and Ida Jean great houses for use of a limited nature, including the deposit of the dead within its walls. Rather than monolithic “group think”, the probability is that such ideological versus materialist concerns would have overlapped significantly, with participants holding a range of perspectives.

13.4.3 COHORT HYPOTHESIS

The notion that mortuary location at Wallace during Pueblo III times was predicated upon a common attribute pertaining to age group, sex or injury is rejected. All age groups are represented, as are both sexes. Just seven of the 32 estimated P3WR individuals, or five of the 14 *in situ* remains and iLinks, have skeletal damage not associated with post-deposit processes. Of these, only the injuries of HR 3, HR 11, and possibly HR 6 and ISE radius 108 may have been physically noteworthy or memorable. Regardless of the comparative prevalence of these injuries, they are not present in every individual deposited at Wallace.

13.4.4 HOUSE SOCIETY HYPOTHESIS

Drawing upon evidence presented in Chapter 12, the conclusion here is that the house society model offers the most plausible explanation for the Pueblo III mortuary evidence for Wallace. The evidence for this determination comes from the correspondence of Wallace evidence to all four of the house society variables:

architectural spaces, origins, a focus on ancestors, and the presence of inalienable (communally owned) heirlooms. Put another way, there are no grounds to refute the notion that the use of Wallace after AD 1180 involved a house society social organisation. This model is also useful since its interpretive flexibility allows for the integration of aspects of two hypotheses that, in their own ways, provide meaningful insights.

Accordingly, the Chacoan Revival hypothesis is relevant. Rather than conceptual notions current in the MVR region, the manifestation of a Pueblo III house society at Wallace involved the deliberate attempt to recall *first-principle* origins, those actual or perceived connections to the founding house society, as represented by the mortuary programs of Pueblo Bonito's burial room clusters. Comparison of demographic structures suggests that Mills' (2015) postulated West Cluster house society is more likely to be the reference or descent group than that of the North Cluster. However, another possibility is that the P3WR age-structure reflects indigenous concepts regarding the need to include all age groups within a mortuary program.

Interestingly, analysis of Wallace's Pueblo II evidence is not suggestive of a house society social organisation based on either of these two Bonito groups. There is good material culture evidence for a direct connection to Chaco Canyon in terms of architecture and origins; however, evidence for ancestor veneration and the association of communal heirlooms with mortuary deposits is tenuous. Other potential explanations for these last two factors include a generalised "cult of the ancestor," as opposed to the focus on specific house ancestors, fertility and interactions with the natural world and maternal associations. At most, the Pueblo II house society structure may have been related to a non-Cluster group from Pueblo Bonito or another Chaco Canyon great house.

Certainly, the imperative to travel some distance to two, or possibly more, Lakeview Group great houses abandoned for several decades, to conduct rituals and to bury the dead within their walls after AD 1180 signals the existence of social factors beyond the ordinary. The change in the long-standing mortuary tradition of residential burial for the Wallace deceased, especially, highlights a pronounced change in perspective about how to deal with bodies of the dead. These alterations not only included where they should be in terms of proximity to their bereaved; they also involved a change in where bodies were to be located and how they were to be arranged: primarily, on the floors of buildings and in a very unusual and specific postural arrangement. In addition, the insertion of a Pueblo III kiva into the roomblock and remodelling of two rooms to include kiva attributes, presumably concurrent with this mortuary use, implies the intent to re-consecrate the great house albeit with contemporary architectural elements. In total, these changes are of such scale and distinction that the interpretation that rising social stressors implicated in the Socio-natural Hypothesis prompted this response is sensible. It is thus worth again acknowledging Gillespie's (2007:41) view that house societies provide a means to mediate stresses associated with the influx of migrating groups having diverse experiences and histories, and potentially worldviews.

Whether this formulation represents a group in which everyday life was structured by house society precepts or one in which efforts were limited to the renewal of ritual observances or religious concepts is unknown. Nor is it known if it entailed an effort to create a social organisation that would serve to arbitrate rising social stresses, or if it was instead a means to re-emphasise a real or claimed group identity. In the second case, such efforts could have increased social tensions. A specific marker may be the attacks on HR 11, and possibly HR 3, probably during the early AD 1200s, regardless of whether the impetus involved the elimination of the leader of a rival religious faction, a person wielding influence in decisions of an economic nature, or simply a personal grudge. The combination of difficult, time-consuming logistics and comparability to Ancestral Pueblo normative practices in terms of corpse wrappings, ceramic accompaniments, and the age-sex structure do not suggest a deviant mortuary practice for individuals not deemed suitable for burial within a residential locus.

The arrangements of bodies on floors in a distinctive lower limb arrangement of sensory impact may have been an attempt to adhere to what was perceived, or recollected, as the proper means to recreate a Bonitian house society postural arrangement. Another possibility is that it represents notions specific to this group, a community of practice adopted in the intervening years, or perhaps in reference to knowledge of another, equally valued ancestor interred in this postural arrangement. It could also represent an innovation based on the mapping of a conceptual metaphor onto a cadaver as object which was transformed through mortuary rituals into a persistently viewable, enwrapped *abject* (Nilsson Stutz, 2003). Whatever the intent, the enwrapped corpse's enhanced visibility may well have emphasised the identity of an "ancestor" long after deposition on a surface room floor.

The terminus date for the use of the West Arm cannot be established with certainty. It may have been several months to years before the carnivore intrusion, and even longer for the human intrusions, which almost certainly took place before the final abandonment of the entire Four Corners. Even so, my conclusion is that these intentional incursions are, in some way, connected to the decision to establish, or reformulate, a house society at Wallace. Although the whereabouts of the cranium of HR 4 has not been established, the weight of the evidence does not suggest the intent to acquire it for use in ancestral veneration rituals held elsewhere, or by enemies for their own purposes. Instead, the disturbances of both superior skeletons indicate the intent to acquire objects within one or both mortuary contexts. Since HR 4 was deposited upon a floor, it is even possible that such items may have been added during subsequent commemorations.

The intrusions pathway to each mortuary locus is so specific that it is almost certain that the locations of both individuals were known, or handed down through oral tradition. The absence of evidence of intentional disturbance of the hundreds of Ancestral Pueblo mortuary contexts evaluated in this study suggests their world-view included the deeply engrained, widely-held notion that the bodies of the dead were not to be disturbed deliberately. Whether this was based on propriety or a religious view that equated such actions with spiritual and natural disorder is unknown. Yet, if such actions were not countenanced, they carried the risk of social censure, or worse.

The diverse ways in which skeletonised bones were treated during, or consequential, to these intrusions offers insights regarding attitudes of these actors towards the Wallace dead. Of principal import is that none provides compelling evidence for post-mortuary ancestor veneration rites. The disordered re-deposits of bones rather suggest the impetus of propriety. The movement of bones to the North Cluster signals the intent to prevent further damage. In contrast, the failure to reseal the entrance of the "punched-through" holes to prevent the entry of animals may suggest that this was not of concern. Alternatively, these holes may have been blocked with sagebrush or other organic materials that eventually disintegrated. Such deviations from the norm are nigh impossible to interpret in the absence of knowledge of the specific social and environmental contexts that prompted these actions (Cherryson, 2008). Only the structured re-deposit of iLink 326 suggests a focus upon bones as representative of a specific person. However, the chances are that this grouping represents a poignant act involving emotion and personal memory that is rarely discernible in Ancestral Pueblo archaeology.

Rather than a depredation by violators, these events were probably sanctioned on the basis that they comprised "objects of memory" integral to Wallace's Pueblo III house society identity. As such, they were deemed essential to continuance of the house society in a new location. Considering Wallace's decomposition variables, this may have been after AD 1250, when the MVR population shifted to settlements some 20 or more kilometres distant, or perhaps, when they decided to leave the Four Corners for good.

13.5 THE CHACOAN REVIVAL HYPOTHESIS, REVISITED

Among the few Ancestral Pueblo mortuary studies with a theoretical perspective, emphasis is placed on evaluating evidence in terms of what it purportedly reveals about existing social conditions (Karhu, 2000; Martin et al., 2001; Stodder, 1986). Though further afield, Meskell (1997:7) offers the same criticism regarding interpretations of mortuary evidence as mere scenes of display, in which observed patterns are construed as representative rather than generative of future actions; thus, structure without agency. However, as noted by Chapman (2000), ritual gatherings associated with death can become catalysts for familial and social change as survivors gather, some from different locales, to confirm and modify social relations, power arrangements and personal and group identity.

Whether all such interactions occurred at Wallace is unknown. Possibly, funeral rites were held within the residential community and involved many participants, with the corpse then transported to Wallace by a few individuals. Even though the undisturbed mortuary contexts indicate that they were not richly accompanied, it is not known what objects were deposited with HR 4 and HR 11 that would be so desired as to instigate an intrusion through thick, masonry great house walls. As noted in Chapter 12, archaeological evidence and Pueblo ethnographic accounts indicate that altar components were disassembled at the end of their ritual use. The rarity of such objects in their use context is in line with inferences that Pueblo Bonito's plaza served as a formal space for public ceremonial displays meant to both legitimise and persuade (Lekson, 1999:135), even though there is no direct evidence of such. Thus, regardless of what was placed in the mortuary context, funeral and corpse transportation could have involved ritual displays using feathers and the like intended to create a memorable episode that left scant traces in the archaeological record, even if one knew which pathway, or pathways, were taken to Wallace.

Setting logistical issues aside, and there may have been many, that Wallace was so distant implies that the impetus, and the arguments advanced, to alter the centuries-long tradition of burial within the domicile to deposit some of their loved ones within its walls must have been compelling. It would mean that possible recurrent commemorations, such as the simple sprinkling of maize pollen or ashes on the nearby mortuary locus, may not have been possible for the elderly or the infirm. On the other hand, it is not known what attitudes Ancestral Puebloans were "supposed" to have toward the dead, regardless of emotional state. If similar to Pueblo beliefs, uttering the names or speaking of the recently dead is frowned upon as it is liable to "recall" them back to the world of the living, with deleterious effect on the natural order (Ortiz, 1969). Ultimately, what this circumstance suggests is that the break in this tradition owes to powerful social forces, or perceptions of such, that appear to have been quite localised and which, ultimately, had no influence in mortuary programs discovered at other MVR or MSJR sites to date.

The c. AD 1240 timespan of the Chacoan Revival hypothesis post-dates Wallace's radiocarbon dates by several decades Yet, another possibility is that the same concepts central to the Wallace house society persisted in memory, but became expressed differently. In psychological terms, Anthony Wallace (1956a:270) describes this process as "mazeway reformulation" which comprises the “restructuring of elements and subsystems which have already attained currency in the society and may even be in use.” Thus, Bradley (1996:252-254) specifically references Wallace’s notion when advocating that the “D-shape” village layout for Sand Canyon Pueblo, and the shape of the Pueblo III mug, were drawn from metaphorical concepts with religious connotations embedded in widely-known and readily-recognised elements of Chaco Phenomenon material culture, even some 100 years later.

13.6 Conclusions: Recollections of First-principle origins

So, to summarise, the conclusion of this thesis is that the Pueblo III use of Wallace Ruin as a mortuary facility represents the recollection of *first-principle* origins of a Pueblo II house society. Rather than drawing upon such notions extant during the Pueblo II occupation of Wallace or other Chacoan great houses, this Pueblo III expression draws specifically upon memories of house society social organisation at Pueblo Bonito, where mortuary deposits were used to establish and maintain socio-ritual authority and influence. Given the timescale involved, rather than first-hand experience it is more likely that such memories involved oral tradition, though perhaps no more than a generation removed. Key mortuary variables at Wallace and Bonito include deposit on a room floor and postural arrangements that differ from the more common lateral/flexed composition. Moreover, no MVR domicile contains evidence suggestive of a house society social organisation. Although the specific dates and timespan for this use of Wallace is unknown, radiocarbon and stratigraphic evidence demonstrate that it was sufficiently long for intermittent depositions rather than a single episode. Demographic variables suggest that the West Cluster group is the more likely reference of the two ostensible Pueblo Bonito house societies centred in its Old Bonito quarters. Yet, the unique postural arrangement of several Wallace individuals may imply traditions or concepts separate from the community of practice of both groups. Possibly, it entails an innovation that represents a material expression of metaphorical concepts held by an indigenous MVR group, or even ideas introduced by immigrants into the region during Pueblo III times. Alternatively, as noted above, it may represent inaccurate memory or a misinterpretation of an oral tradition.

The timing of the intentional intrusions into the mortuary contexts of HR 4 and HR 11 is unknown, though architectural and stratigraphic evidence is conclusive that it occurred in the prehistoric period and that it took place after the West Arm was no longer being used as a mortuary facility. Both may have been specifically targeted, though it is also possible that remembrance of which individual had what accompaniments may not have been completely accurate. Even so, the direct line to each disturbed context indicates that at least one intruder had personal or specific knowledge of where these two individuals had been deposited, several to many years prior. This implication, along with the scale of effort and potential risk entailed with violation of long-held social and religious prohibitions, suggests that these two intentional disturbances were sanctioned. The removal of objects rather than a focus on the bones themselves suggests that the intent was to recover specific things. Possibly, they may have been central to the establishment of a house society in a more distant location. In short, they were “objects of memory” with deeply meaningful connotations and which were also potentially powerful, either as symbols or holding agency in themselves. In contrast, the re-deposit of damaged skeletonised remains in the North Suite represents a response to a crisis consequential to the decision to use the building as a distant, non-residential mortuary facility. The re-assembly of iLink 326 more likely represents personal sentiment rather than a symbolic reconstitution of an ancestor in accordance with a structuring principle held either by Ancestral Puebloans in general or a specific mortuary community of practice.

13.7 Research Methods Contributions

The complexity of Wallace’s status, mortuary setting and skeletal evidence necessitated the application of methods not previously applied in Ancestral Pueblo research. In addition to their utility in getting to the core of the Wallace conundrum, several approaches have potential to contribute to research beyond the needs of this study. This bioarchaeological study of Wallace Ruin and Marden’s (2011) study of remains from the northern burial rooms of Pueblo Bonito share many similarities. Each provides new perspectives on old interpretations. Both demonstrate that re-association of skeletal elements from different rooms, in concert with the interrogation of field documents, can provide an effective means to establish the locations of primary burial deposits. Her more successful venture decreased the number of “burial rooms” in the North Cluster by half. At Wallace, the inability to make successful inter-suite matches calls into question the assumed connection between the South and North Suites. Although skeletal damage is a factor, the dearth of such matches prompted the consideration of other potential factors.

In Ancestral Pueblo studies, consideration of corpse decomposition stages primarily centre upon the segregation of dry-bone damage incurred during the post-deposition period versus peri-mortem damage associated with violence or carnivores. Yet, *anthropologie de terrain* provides a refined taphonomic approach based on human anatomy and corpse decomposition stages, in which skeletal displacements from anatomic position are used to establish the mortuary microenvironment at deposit. The circumstances at Wallace provide both impetus and means to advance this approach through the development of Range of Motion (ROM) criteria suitable for quantitative skeletal analyses. Rather than subtle changes that can be attributed to burrowing animals, the application of lower limb ROM standards identifies large-scale movements of the lower limbs during corpse decomposition. This determination contributes significant lines of evidence. First, it provides non-ambiguous evidence that decomposition occurred in an open environment since such gross movements of the body’s largest anatomic unit cannot occur otherwise. Second, the expectations for several common postural arrangements in terms of limb angles is supplemented by the identification of the bone surfaces that should be visible in that configuration. With the current constraints on active research involving human remains in the American Southwest and elsewhere, an analytic approach that makes use of field photographs, both published and archived, provides a potential means to identify the intentions of buriers and, at the same time, develop a better understanding of specific site formation processes.

In addition, taphonomic analyses of Ancestral Pueblo remains with carnivore damage generally adopt a typological approach that focuses upon the identification of specific skeletal indicators (Marden, 2011; Martin et al., 2001). On the other hand, a broader forensic approach in which the skeletal damage/disarticulation sequence is correlated with corpse decomposition variables has not been undertaken to date. In this respect, the analysis of Wallace’s isolated skeletal elements study breaks new ground, as it provides a means to refine the estimate of the post-mortem interval between deposition and disturbance in archaeological remains.

13.8 Future Research

Although this study follows Buikstra's (1977) concept of bioarchaeology that emphasises the correlation of skeletal and archaeological evidence, future research questions are firmly in Larsen's (2002; 2006) sphere in which biological evidence is privileged. One of the unresolved matters pertains to what criteria may have been employed to decide who was deposited at Wallace. Demographic evidence is in line with a residential group, and thus an extended family or small community. Results of a discrete dental traits analysis conducted by Kathy Roler Durand [of Eastern New Mexico University] are forthcoming regarding potential affiliations with other San Juan Region populations. Unfortunately, the sample size is too small to evaluate kin-relations within this group.

On the other hand, an intriguing proposition is that those chosen were selected on the basis that they had been "cured" by ritual specialists, which in Pueblo societies can result in the obligatory induction into a medicine society (Ortiz, 1969). Thus, future Wallace projects include providing a full report on the detailed skeletal analyses, already completed and in keeping with current disciplinary standards. The intent is to make this information available for research questions asked by other scholars who adopt the approach emphasised by Larsen. I will also present a study in accord with Larsen's perspective, though in terms of "pathological identity." In the Curing Hypothesis, the potential is considered that individuals are ritual oblates for a medicine society, chosen for deposit at Wallace based on unusual or severe conditions with obvious symptoms likely to have prompted the intercession of ritual specialists. Although this explanation is rejected in the case of Wallace's primary burial deposits, its consideration should provide a useful line of inquiry in Ancestral Pueblo bioarchaeological research.

Although a plausible explanation of the use of Wallace is a significant research outcome, the information obtained to meet the needs of this project provides a fundamental source for future studies, whether by this or other researchers. The very large, comprehensive comparative database is especially suitable for evaluation of post-processual questions pertaining to MVR primary burials; though the data are adequate, interpretations regarding MSJR primary burials would benefit from a similar intensive investigation of mortuary location choices. Moreover, the enlargement of that study area to include the Chuska Slope locality of western New Mexico offers an opportunity to identify possible Pueblo I precedents that subsequently influenced house society formulation at Pueblo Bonito. Although studies focused upon the interpretation of Ancestral Pueblo violence is not a primary interest of this researcher, the balanced MVR sex structure of individuals represented in the Mortuary Location Database will be useful to scholars who, as in the case of the interpretation of Kohler and Turner (2006) regarding raiding for women, have so far relied upon inadequate samples.

Southwest researchers have long been stymied by the inability to identify meaningful patterns within the overarching Ancestral Pueblo mortuary program of residential burial. This failure has resulted in the common, functionalist viewpoint that Ancestral Pueblo mortuary location decisions were a practical matter based on expedience, or as deemed by Roberts, "convenience" (1929:149). Cattanach's (1980:141) interpretation is representative of such widely-held views: "Quite obviously, burials were place where a minimum of digging was necessary, i.e., in soft, trashy fill within the pueblo, or in pockets of dirt or fill caught between or behind boulders or irregularities in the bedrock on the slopes below." Lister and Lister (1987:53) express the similar view when stating "In this instance, using an enclosed empty house structure was merely a matter of making the most of what was available with the least expenditure of energy." If anything, this study of Wallace's variant mortuary program, or perhaps more accurately the Lakeview Group program, has demonstrated that it was anything but convenient.

However, just because analyses of Ancestral Pueblo skeletal orientations, body positioning, and variability in mortuary location choices have not yielded insights regarding possible symbolic meanings, the notion that no such underpinnings existed, or apparently merit consideration, is contra to scholarly treatments beyond the Southwest. Those studies effectively demonstrate that such themes as emotion, gender, personal identities, deviant burial locations, and embodiment, in the same vein as Wallace's notion of body image, can be integral to the production of mortuary contexts (Goldstein, 2006; Hodder, 1982; Insoll, 2007; Meskell, 2001; Murphy, 2008; Parker Pearson, 1999; Sofaer, 2006; Williams, 2006). Accordingly, Ancestral Pueblo mortuary location choices should be assumed as laden with concepts meaningful to survivors and buriers. *The Bioarchaeology of Individuals*, the comparatively recent volume edited by Southwest bioarchaeologists Stodder and Palkovich (2012), makes significant strides in this regard since three of its 17 chapters consider evidence from a Southwest mortuary context in terms of individual identity. Neitzel (2012) evaluates artefacts found with an Early Pueblo III adult male, widely known as the "Magician", as potential indicators that he was an ancestral Hopi leader. Merbs (2012) considers the notion of newborn burial location within the postulated birth room as a mechanism of "soul transfer", and Palkovich (2012) evaluates the possible connection between mortuary locus and physical disability. All suggest possible means of identifying such individuals or places at Wallace Ruin, but, even so, none considers the evidence explicitly in terms of symbolic notions. Plog and Heitman (2010) attempt to explain Pueblo Bonito's Room 33 mortuary deposits of burials and items in respect to symbolic concepts, but their arguments founder on an understanding of depositional microenvironments that have since been demonstrated as inaccurate, either by Marden (2011) or in this study.

More likely, the problem is not that symbolic meanings were not integral to Ancestral Pueblo mortuary practices. Rather, Southwest scholars' apparent lack of awareness of the range of approaches offered in the subdiscipline of mortuary archaeology means that longstanding approaches are insufficient to recognise such evidence. The house society model provides a plausible explanation for the use of Pueblo Bonito and Wallace. Yet, it does not suggest explanations regarding why individuals were deposited near walls, even when in subfloor locations with no logistical impediments to further room use. Nor does it address why floors may have been used, other than precedence. Also, are there better, and less pejorative, explanations for deposit in middens besides "convenience"?

The opportunity to further develop Anthony Wallace's notion of the mazeway as a metaphorical mental map is provided by Ortman's (2000; 2008; 2010) studies of material metaphors of the Mesa Verde Region. To soften this critique of the impoverished state of Ancestral Pueblo mortuary studies, his attempt marks a significant move away from the focus on environmental adaptation that has long held sway in Mesa Verde Region archaeology (Lipe, 1999). So, too, is Ryan's (2013) application of semiotics, or the study of signs, to investigate kiva construction technology as an archaeological "community of practice;" of note, her study includes evidence from other Lakeview Group great houses. Just as an example, Ortman's identification of fundamental, Ancestral Pueblo symbolism regarding buildings provides a means to evaluate MVR corpse location choices in terms of liminal spaces associated with boundaries. There is also potential to demonstrate that the high correlation of primary burial deposits with cultural refuse, regardless of spatial location, represents a meaningful act prompted by the intention to inter the dead within deposits containing a variety of materials with symbolic connotations. For example, they contain sherds, which are from bowls, which in turn symbolise the shape of the universe. A potential metaphorical concept pertaining to ash deposits, a major component of cultural refuse, is not addressed by Ortman. Although Christians construe ash as a symbol of penitence (Holloway, 2008:87), in Mesoamerican and Puebloan cosmologies it is integral to a linked chain of metaphors involving the production of smoke, which signifies dark clouds that in turn stand for ancestors (Parsons, 1939:170-172; Schaafsma, 1999:165; Shafer, 1995:43).

The large mortuary database developed for the needs of this study would provide a means to evaluate questions pertaining to such notions with rigorous quantitative methods. Such research offers the potential to answer longstanding archaeological questions, but it would also more fully situate Ancestral Pueblo peoples in the rich complexity of human history. The disturbance of the graves of past people for scholarly research deserves no less than a fully integrated approach to bioarchaeology. In other words, it is time to "remake the mazeway" in studies of Ancestral Pueblo burial practices.

Remaking the Mazeway:

Skeletal and archaeological evidence for a variant Ancestral Pueblo mortuary rite at Wallace Ruin (USA)

Volume 2 of 2

Submitted by CYNTHIA SMITH BRADLEY
to the University of Exeter
as a thesis for the degree of
Doctor of Philosophy in Archaeology
May 2017

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: …………………………………………………………..

APPENDICES

APPENDIX A

STRUCTURE "LIFE HISTORIES"

WEST ARM OF WALLACE RUIN

Structure	Construction Phase
West Arm (Plan)	1-4 (c. AD 1040s-1280)
NON-SUITE	
Structure 2 "Old Wallace"	2 (c. AD 1090)
Structure 7	3 (c. AD 1120s)
Structure 15 "Old Wallace"	1 (c. AD 1040s)
Structure 17	3 (c. AD 1120s)
SOUTH SUITE	3 (c. AD 1120s)
Structure 18	
Structure 19	
Structure 26	
Structure 27	
ANNEX	3a (c. AD 1130s)
Structure 29	
Structure 30	
NORTH SUITE	3 (c. AD 1120s)
Structure 5	
Structure 6	
Structure 8	
Structure 9	

Introduction

Summary details regarding major episodes in the “life history” of a West Arm structure and the human remains data associated with these events are provided in stratigraphic profiles and tables by structure. The Figure A.1 plan, which situates these structures relative to each other, and the stratigraphic cross-sections are based on maps drafted by Bruce Bradley. The locations of human remains in these profiles are identified by stratum (Strat) or surface (Surf); the latter designation encompasses both prepared floors and use-surfaces. His interpretations regarding stratum characteristics serve as the primary source of data, with some adjustments. For simplicity’s sake, the identified position of a primary burial deposit may approximate its position in respect to the axis of the structure’s cross-section.

In general, the discussion of a structure life history addresses only those points relevant to this thesis. The expectation is that this format will enable the reader to readily access the information needed to comprehend the complexities of the various mortuary and post-mortuary behaviours. In these tables, the abbreviation PII-III means that the chronological period cannot be firmly ascertained using stratigraphic or artefact evidence. The designation PIII+ means that the event could have occurred at any time during the Pueblo III Period or later, unless specified otherwise.

Rather than a strict numerical order, structure presentation is ordered by major architectural subunit to correspond to the chronological use of the rooms for mortuary purposes, consistent with the approach established in Chapter 6 and which is again employed in Appendix E. The first section pertains to evidence from non-suite rooms, which includes the only two Old Wallace structures having more than one or two isolated skeletal elements. The next section pertains to the South Suite structures, followed by those of the Annex, with finally four structures that comprise the North Suite. The Figure 1 plan map, which identifies the locations of all primary burial deposits or a specific secondary mortuary treatment, also includes detailed information regarding the locations and status of passageways at archaeological excavation. The status of these entryways at construction are described in the relevant section. A similar map is provided in Appendix E since that document evaluates the circumstances involved in the movement of bones from one location to another. Finally, key findings or interpretations are highlighted in text by structure, including determinations of chronological period for primary burials and isolated skeletal elements.

For the sake of brevity, this presentation does not include information from the Phase 1 Structures 14 and 25 since each contains only one human bone: a child's cranial fragment and an adult calcaneus, respectively. In each case, the bone is from a fill stratum within a structure that was completely filled with natural or mixed fill units long before the Pueblo III use of Wallace Ruin. Moreover, neither structure has a doorway that provides a direct connection to a Phase 3 (or Phase 4) structure. The original provenience of each bone is unknown, as is how they came to be in these units. Movement from another location during animal burrowing is a distinct possibility. Another possibility is that a human unintentionally collected the skeletonised bone from a disturbed or unrecognised mortuary context when intent on collecting fill for construction purposes. Neither element is included in the P3WR subset.

Architectural information regarding STR 1 (or Kiva 1) is relevant to the interpretation of human remains from STR 15. However, this Phase 4 kiva contains two bones only. One is a tooth fragment located within a pile of dirt situated on the modern ground surface. It is unclear if this back-dirt was produced by animal denning or an unauthorized excavation. Both it and an incomplete adult sphenoid located in the kiva's subfloor vent tunnel were probably transported to these separate locations by burrowing animals. Given their association with a Phase 4 structure, both bones are included in the tally of P3WR bones; however, neither element is included in any other analysis.

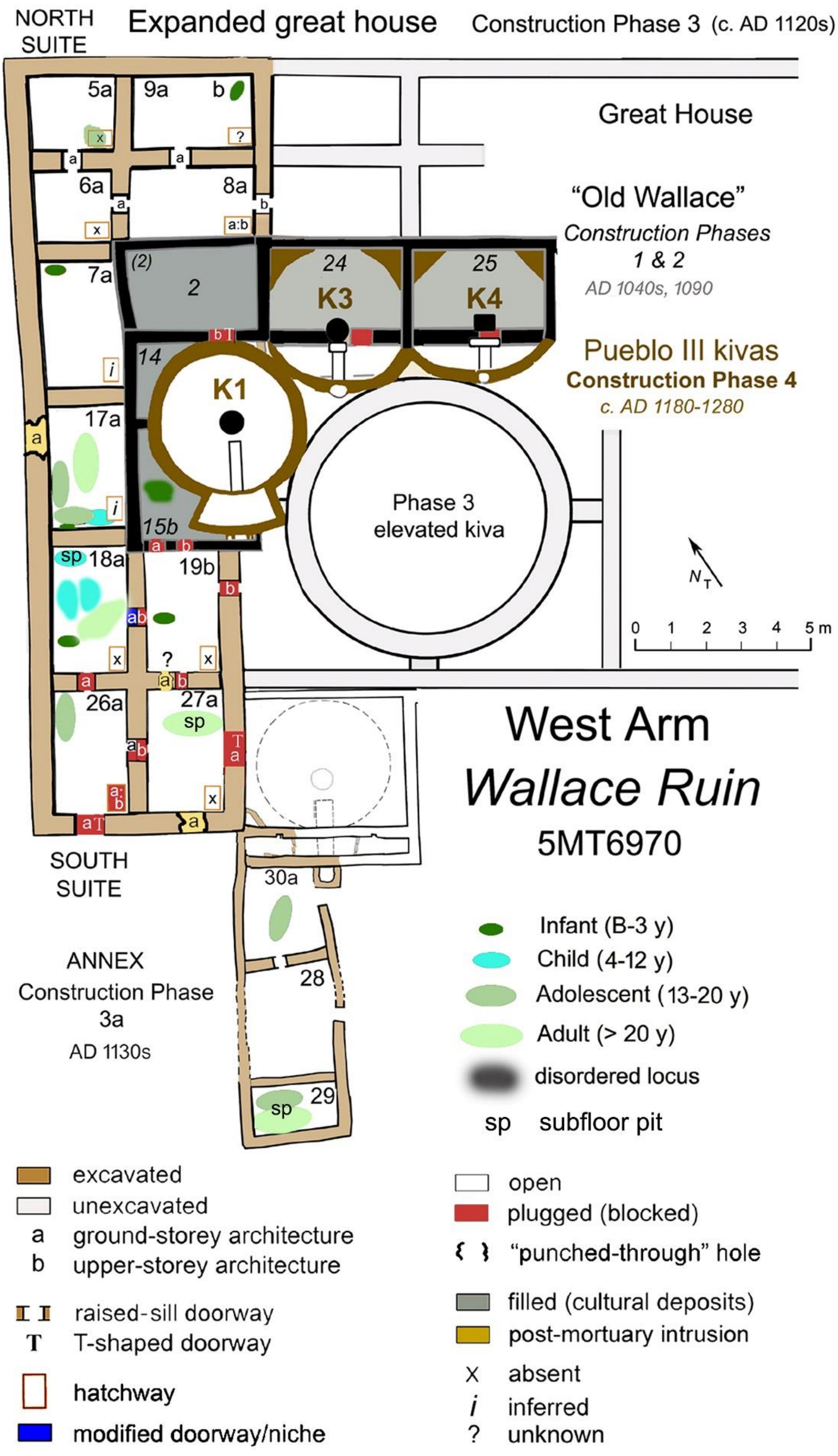


Fig. A.1: Plan of the West Arm of Wallace Ruin, showing: structure locations; the status of passageways at excavation; and, the locations and orientations of individuals classed as a primary burial deposit, including one (Room 5a) accorded secondary mortuary treatment.

NON-SUITE STRUCTURES

STRUCTURE 2

The only Phase 2 structure within the West Arm comprises Rooms 2a and 2b of Structure 2 (Fig.A.2, Tab. A.1). This structure was formed by the addition of walls that connected the north and west arms of the early great house. Both rooms functioned as storage rooms prior to eventual use as Pueblo II midden.

Structure life history

- STR 2 was abandoned and filled with natural and cultural deposits long before AD 1180;
- there is no direct access into Phase 3 structures that share common walls on the north and west sides of Structure 2;
- animal burrowing within and between these strata is a noteworthy source of post-deposition relocations of artefacts.

Human skeletal remains

- No primary burial deposits or articulated units are located in Structure 2.
- Strat 6 (natural fill) contains all but three of the 22 ISE. Each of these 19 bones is small in dimension, with the hands, feet and vertebrae most commonly represented. Strat 2 contains 3 small bones (infant ischium and ilium, adult vertebra).
- Strat 2 is the only provenience in which a significant cultural refuse deposit is associated with human remains. Potentially, the three bones from Strat 2 bones were unintentionally transported by humans from an upper, disturbed 15b stratum during STR 1 construction. Or, they may have been transported from Strat 6 by animal burrowing.
- Alternatively, the Strat 2 bones were dropped accidently whilst being transported to the North Suite after AD 1180.
- Alternatively, all 22 bones were re-located to STR 2 and moved between strata during animal burrowing.

Determinations of chronological period for human remains

All bones from Structure 2 are assigned to the P2WR subset. A Pueblo II origin for some or all ISE has some uncertainty given the proximity of STR 2 to rooms with PIII human remains, the magnitude of animal disturbance, and the easily-transportable size of these bones. Even so, a Pueblo II date is probable considering that the large majority of the bones are in a lower stratum and that no bone evidences the taphonomic signature (canid-damage, weathering) of bones deposited after AD 1180. The uncertainty regarding the period of origin of the ISE is immaterial since few elements are suitable for pathological assessment or of the element type (e.g., long bone) used in population structure analyses. However, their condition is sufficient to ascertain that all four age classes are represented.

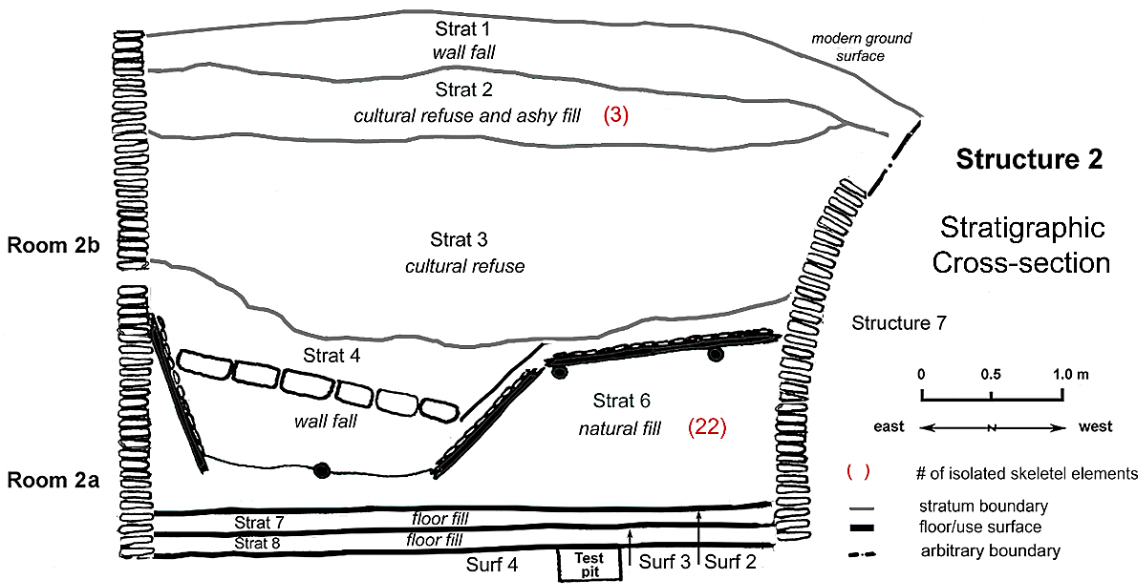


Fig. A.2: East-west stratigraphic profile of STR 2, with summary data regarding locations of human remains

Table A.1: Chronological sequence of major events regarding Structure 2 (Phase 2); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey, single-coursed masonry walls; appended to the north and west walls of Phase 1 STRs 14 and 24.
	Construction of the upper-storey and ground-storey floors (Surf 1, Room 2b; Surf 4, 2a).
	Construction of a hatchway in the SW corner of the upper-storey floor (Surf 1) of Room 2b.
	Addition of a second (Surf 2) and then a third (Surf 3) ground-storey floor over accumulated floor fills (Strata 7 and 8).
	Mixed accumulation of cultural and natural fill (Strat 6) develops over Surf 3.
	Collapse of the floor (Surf 1) and walls (Strat 4) of upper-storey Room 2b onto Strat 6.
	Structure abandonment (c. AD 1075-1100).
PII (Late)	Accumulations of cultural refuse; use as an intra-mural midden (Strat 3).
PIII	Deposits of cultural refuse mixed with ashy deposits (Strat 2) derived from Phase 4 construction of Structure 1 (kiva).
PIII +	Collapse of the upper-storey walls (Strat 1); some from Structure 1.
	Skeletised remains (ISE) moved across and between strata and structures during animal burrowing; Strat 2 (3); Strat 6 (25).

STRUCTURE 7

The Phase 3, two-storey Structure 7 was appended to the west walls of Structures 2 and 14 c. AD 1120s (Fig. A.3, Tab. A.2). The absence of doorways in Rooms 7a and 7b, and the lack of fire-pits, indicates initial use as constrained-access storage rooms. Following structural collapse, STR 7 functioned as a Pueblo III intra-mural midden.

Structure life history

- A deposit of natural and cultural fill (Strat 6) gradually accumulated over the second (or upper) ground-storey floor, Surf 2. The preponderance of Mancos Black-on-white, along with Cortez B/w and Cibola Whiteware sherds suggests that this stratum developed in the middle to late 1100s.
- Strata 2 and 4 contain thick deposits of cultural fill. The occurrence of numerous Mesa Verde Black-on-white sherds in each stratum indicates

that 7b, and the upper part of Room 7a, functioned as a Pueblo III intra-mural midden after AD 1180.

•All three fill units contain extensive evidence of animal burrowing and movement of materials within and between strata.

Human Skeletal Remains

•Structure 7 contains one primary burial deposit, no articulated units, and 33 isolated skeletal elements.

•Primary burial HR 7 was deposited on Surf 2, a Pueblo II floor. There are no grave goods. This young infant was not covered with refuse, but sherds in the overlying Strat 6 are almost exclusively Pueblo II wares.

•The ISE from Strat 2 (4) and Strat 4 (7) are in cultural fill (intra-mural midden) units deposited after AD 1180.

•In general, the ISE from Strat 2 (4), Strat 4 (7) and Strat 6 (22), are small, fragmentary and show evidence of weathering or canid-damage.

•Inter-mural Links: An adult frontal fragment (7.57.1312) in Strat 4 refits to Cranial Link 145 fragments located in several other rooms (18a, 26a, 6a).

Determinations of chronological period for human remains

HR 7 is classified as a Pueblo II primary burial based on this individual's location on a Pueblo II surface that is overlain by Pueblo II material culture. All 33 ISE are allocated to the P3WR subset. This is primarily due to taphonomic characteristics shared with skeletal remains that are confidently dated to the Pueblo III Period, such as Cranial Link 145. The presence of PIII material culture in Strata 2 and 4 is another factor. Possibly, the occurrence of ISE in this structure is attributable primarily to the unintentional dropping of bones by humans into the upper strata of STR 7 as they transferred disturbed, canid-damaged bones from the South Suite to the North Suite during the early to middle AD 1200s. The presence of ISE in lower strata is best explained by transportation downward during animal burrowing. The uncertainty regarding the period of origin of the ISE is immaterial since few of these elements are suitable for pathological assessment or of the element type (e.g., long bone) used in population structure analyses. However, their condition is sufficient to ascertain that all four age classes are represented.

Table A.2: Chronological sequence of major events regarding Structure 7 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey, single-coursed walls; appended to the west wall of the Phase 1 great house (STRs 2 and 14); north wall shared with STR 6; south wall shared with STR 17.
	Construction of the upper and ground-storey floors (Surf 1, 7b; Surf 3, 7a).
	No doorways; hatchway (inferred) built into the SW corner of Surf 1 (7b); roof hatchwav existence unknown.
	Development of a use-surface (Surf 2) over mixed (cultural and natural) floor fill (Strat 7).
	Deposit of primary burial HR 7 upon Surf 2.
	Gradual accumulation of Late Pueblo II mixed fill (Strat 6).
	Partial collapse of Surf 1 wood and adobe materials (Strat 5) onto Strat 6.
PIII	Deposits of cultural fill accumulate above and below (Strata 2 and 4) the intact and fallen sections of Surf 1.
PIII +	Collapse of upper-storey walls (Strat 1).
	Generally weathered and canid-damaged ISE moved across and between strata and structures during animal burrowing; Strat 2 (4); Strat 4 (7) and, probably, Strat 6 (22).

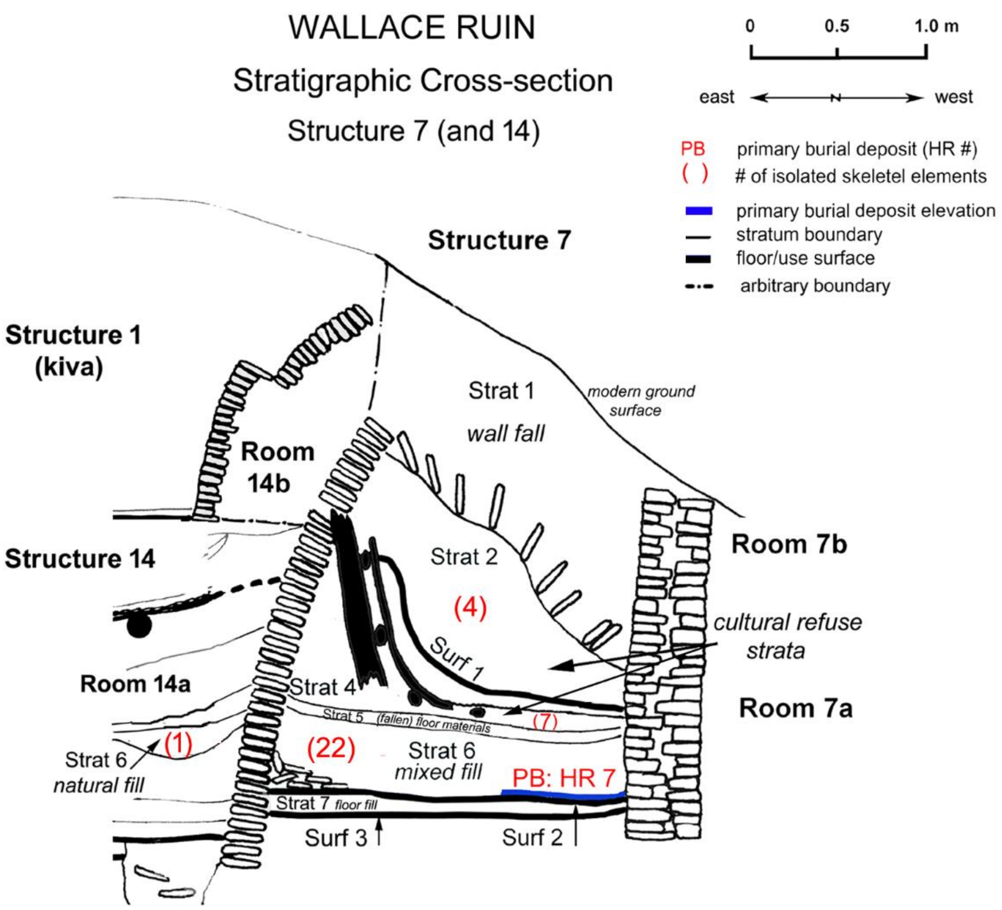


Fig. A.3: Stratigraphic profile of STR 7, with summary data regarding locations of human remains.

STRUCTURE 15

The two-storey Structure 15 was erected c. AD 1050 (Early Pueblo II) as part of the original Chacoan great house (Figs. A.4, A.5; Tab. A.3). Doorways and hearths in both stories indicates use as habitation spaces. However, Room 15a functioned as a Pueblo II intra-mural midden after an intense fire.

Structure life history

- STR 15 shares no passageways with Phase 3 structures on its west side.
- Pueblo II strata completely filled Room 15a and lower Room 15b.
- Room 15b was inaccessible through the (blocked) 15a/19a doorway after the completion of the STR 1 at some point after AD 1180.
- The original upper-storey floor (Surf 2) was overlain by accumulations of fill (Strata 4 and 5) followed by the development of a use-surface (Surf 1) at the upper contact zone of Strat 4. Ceramic seriation indicates that these events took place c. AD 1130-1150 (Late Pueblo II).
- During the Late Pueblo II occupation, an intense structure fire burned organic materials on Surf 1 and oxidized Strata 4 and 5 sediments.
- The Phase 4 construction of the kiva (STR 1) caused or contributed to significant disturbance of sediments and materials within Strata 4 and 5.
- Mesa Verde Black-on-white sherds within Strat 2 indicate that this unit originated after AD 1180; probably, the clay fill represents an intentional deposit associated with the construction of STR 1.
- An informal slab-lined cist (Feature 7) is located within Strat 2.
- Animal burrowing is a second source of displacement of materials within and between strata.

Human Skeletal Remains

- Structure 15 contains no primary burial deposits, but it has one Individual Link, one anatomic unit, and 31 ISE.
- The 19 cranial and infra-cranial elements from the young infant (B-6 m) iLink 366 were recovered from several 15b proveniences (Strat 2, Surf 2, Strats 3-5), though 15 bones are from Strat 5. These elements were so dispersed, and the associated strata so disturbed, that no mortuary

location was identified during excavation. Identification as an individual Link occurred during laboratory analyses.

•The lack of heat damage to the bones suggests that the infant was placed upon or within sandy fill just above the original floor (Surf 2) and was thus buffered from heat by overlying sediments in Strata 4 and 5.

•No complete vessels were found in 15b, but whether iLink 366 was originally associated with a concentration of secondary (midden) refuse is unknown.

•Forearm Link 368 comprises 11 bones from the right forearm and hand of an older child (juvenile). It is categorised as an articulated unit even though not all bones are in precise anatomic position. These elements are in an elongated yet basically anatomic alignment within remains of an animal burrow traceable within clay fill (Strat 2) of Room 15b.

•As shown in Figure A.4, the forearm long bones and the unfused distal radius epiphysis are in anatomic position; the hand (5) and wrist (3) bones are in close anatomic position though displaced from the long bones. The configuration of Link 368 suggests that it was to some degree enfleshed when moved through the animal burrow from an unknown location.

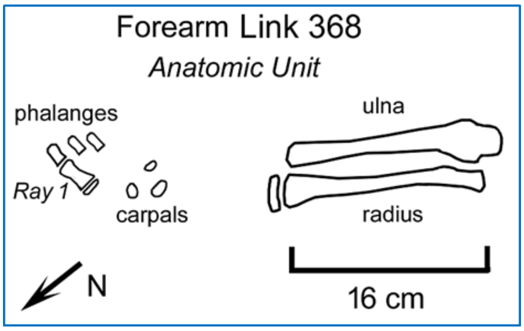


Fig. A.4: The near anatomic configuration of forearm, wrist and hand bones from an older child. Location: rodent burrow, Strat 2 (clay fill) of Room 15b.

•Possibly, Forearm Link 368 and two other ISE were introduced unintentionally when clay fill was obtained elsewhere as part of STR 1 construction; however, that each of these bones is within the same rodent burrow suggests otherwise.

•There are no limb bones of similar size and development in an adjacent excavated room or in the North Suite regardless of period.

•An adult metatarsal and a child's ilium (15.47.389) are the only bones associated with the stone cist (F.6, Strat 1); the body size of each individual precluded interment within the cist. Ilium dimensions indicate a child several years younger than Forearm Link 368.

•Inter-mural Links: Cannot rule out that the left scapula of iLink 366 (15.273.376) is the antimere of Scapula 17.190.661 (Strat 4 of 17a).

Determinations of chronological period for human remains

Link 366 is assigned to the Pueblo II subset. That all bones are below Surf 1, and are concentrated within Strat 5, is consistent with a date of deposit prior to a fire in 15b after AD 1140 but prior to AD 1180. On the other hand, Forearm Link 368 is assigned to the Pueblo III Period. Its location within Strat 2 suggests this time frame; however, the more compelling argument is that skeletal evidence is consistent with disturbed PIII remains: Link 368 is isolated from other remains from this individual; moreover, a thoracic vertebra (15.240.371) within this burrow has canid tooth-punctures. The remaining 29 ISE are classified as Indeterminate Pueblo II-III. As is the case for STR 7, the inability to accurately segregate them as either PII or PIII bones has scant effect on pathological evaluations or population estimates.

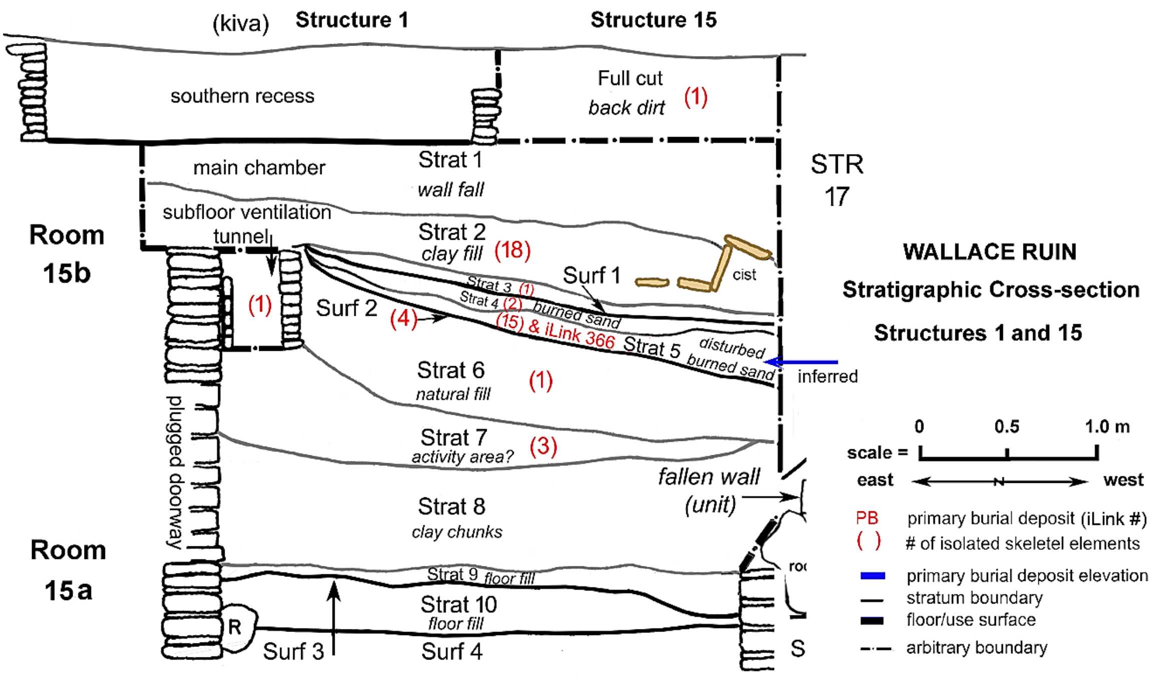


Fig. A.5: Stratigraphic profile of STRS 1 and 15, with summary data regarding locations of human remains.

Table A.3: Chronological sequence of major events regarding Structure 15 (Phase 1); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey walls; north wall shared with STR 14.
	Construction of the upper and ground-storey floors (Surf 1, 15b; Surf 4, 15a).
	Construction of doorways in the east walls of Room 15a (T-shaped) and Room 15b (raised-sill). Unknown if the 15b/19b doorway in the south wall dates to Phase 1 construction of STR 15 or the Phase 3 construction of STR 19. Existence of a Surf 1 or roof hatchway is unknown.
	Room 15a: completely blocked with fill strata.
	Deposit of an infant primary burial (iLink 366) on Surf 1 or on/within Strat 5.
	Room 15b: Accumulation of at least one sandy floor fill unit above the level of iLink 366 prior to the development of a use-surface (Surf 2) on the upper contact zone of Strat 4.
	Episode of intense burning burns chars organic materials on Surf 2; sandy fill within Strata 4 and 5 become orange in colouration during oxidation. East wall is heavily damaged/dismantled. Status of roof is unknown.
	Bones from iLink 366 are not modified by heat exposure.
PII-III	All doorways blocked (plugged with stone).
PIII	Deposit of clay fill (Strat 2) containing Mesa Verde Black-on-white sherds.
	Construction of the Phase 4 STR 1 within the upper half of 15b. The eastern section of the kiva overlaps the east walls of Rooms 14b and 15b; the west walls of Room 14b and 15b form the west retaining wall of STR 1. The remaining east wall of 15b forms the east wall of the subfloor vent tunnel.
	Extensive disturbance and mixing of materials associated with Strata 4 and 5 and also Surf 1 during the construction of Structure 1.
	Complete disarray of skeletised iLink 366 bones and obliteration of their their primary deposit locus; discovered locations for skeletal elements comprise Surf 1 (2); Strat 5 (15); Strat 2 (1) and Strat 7 (1)
	All access to 15b precluded upon completion of Structure 1.
	Skeletised remains (ISE) moved across and between strata and structures during animal burrowing or kiva construction, in addition to Links 366 and 368. Room 15b: back dirt (1); Strat 2 (9); Strat 4 (2); Strat 5 (15); Strat 6 (1); Room 15a: Strat 7 (2).

STRUCTURE 17

The two-storey Structure 17 was appended to the west walls of STRs 14 and 15 during the Phase 3 construction episode, (c. AD 1120s (Fig A.6, Tab A.4). The absence of doorways in either room, along with the lack of fire-pits, is indicative of constrained-access storage rooms. The large, informal “punched-through hole” in the west wall of 17a, and thus the west, exterior wall of the great house, is associated with an intentional incursion during the prehistoric period; *this event post-dates the Pueblo III use of Wallace Ruin as a mortuary* facility.

Structure life history

- •Rooms 17a and 17b were accessible only through hatchways.
- •STR 17 contains no midden deposits.
- •Surfs 2 and 3 (17a) date to the Pueblo III Period.
- •The evidence from Surf 3 represents the final use of 17a, excluding the intentional disturbance of HR 4 in the prehistoric period.
- •Intruders "punched" a large opening through the double-coursed, exterior west wall and dug through strata ranging from the original ground-storey floor (Surf 5) through lower Strat 6. During this episode, materials from surfaces and fill units along the north 1/3 of 17a became jumbled and mixed; materials from this disturbed region are allocated to Strat 4.
- •This intrusion seemingly contributed to disturbed strata along the east wall of 17a; remnant animal burrow tracks were observed within this area as well. Materials from this region are allocated to Strat 8.
- •The large hole in an exterior wall was not blocked with masonry after the intrusion. Whether an organic material was used is unknown.
- •Fill in the upper half of Strat 6, and within Strata 1, 2 and 5 is undisturbed along the west wall at the locus of the 17a "punched-through hole."
- •The south primary beam of Surf 1 was still burning when it collapsed onto Strat 6 (lower half, contact zone).
- •Animal burrowing is a significant source of displacement of bones within and between strata and structures, especially since the hole in the exterior west wall provided direct access into the room at ground level.
- •The intrusion into 17a occurred in the prehistoric period, prior to the burning and collapse of Surf 1 onto the existing contact zone (lower half of Strat 6) and additional structure collapse events.

- Structure 17 contains five primary burial deposits, no anatomic units, and 176 isolated skeletal elements that include numerous cranial and infra-cranial antimeres.
- Two primary burials (HRs 5 and HR 6) were deposited upon Surf 3, and the remaining three (HRs 2, 3, and 4) upon Surf 2. All are accompanied by or on a surface associated with Mesa Verde Black-on-white vessels.
- Most ISE were recovered from Strata 4, 6 and 8.
- The large majority of the ISE are from two or three young infants of very similar size and development, along with a few miscellaneous bones from adolescents or adults.
- The primary deposit location for these infants is unknown, but probably in the disturbed areas in the north or east side of 17a.
- HR 4 was nearly or completely skeletonised when intentionally disturbed during an intrusion in the prehistoric period; the disturbed infant burials were probably skeletonised at disturbance.
- The disturbance of skeletonised primary burials by humans was compounded by extensive animal burrowing; at least one burrow connected fill units overlying the fallen wall between 15b and 17a.
- Only an ISE humerus head fragment from Strat 6 (17.187.508) and a rib fragment from Strat 2 (17.29.411) have damage suggestive of canid tooth marks.
- No *in situ* bone from a primary burial or which can be securely re-associated to a primary burial has canid damage.
- Inter-mural Links: cannot rule out that Scapula 15.273.376 of iLink 366 (Strat 5, 15b) is the antimere of 17.190.661 (Strat 4 of 17a).

Determinations of chronological period for human remains

All human remains in STR 17 are assigned to the Pueblo III Period. The relative dating of the primary burials is conclusive based on stratigraphy, associated grave goods, or AMS dates. The assignment of all ISE to the P3WR subset is somewhat less certain, though highly probable. Potentially, the numerous infant bones from Strat 4 could have originated in a Pueblo II context since there is a slight chance that the intrusion through the west wall cut into the Pueblo II floors, floor fill, or even a shallow subfloor pit. However, several factors suggest otherwise. Firstly, no human remains were recovered from observed 17a Pueblo II contexts; the nine small bones associated with the fallen Surf 1 (17b) were probably re-located from a lower stratum by animal burrowing. In contrast, human bones occur in both Pueblo III use proveniences of 17a. Moreover, the highly cancellous infant bone is in good to excellent condition, unlike those elements from more mature individuals in Wallace Ruin subfloor pits or ashy deposits. In addition, the colouration of almost every bone is consistent with those of the Pueblo III primary burials, including infant HR 2 who is of very similar age and development, as well as the infant bones from the disturbed area by the east wall (Strat 8). Although these bones are also within the region of intentional disturbance, their elevation is that of Surf 2, the upper of the two Pueblo III primary burial deposit surfaces.

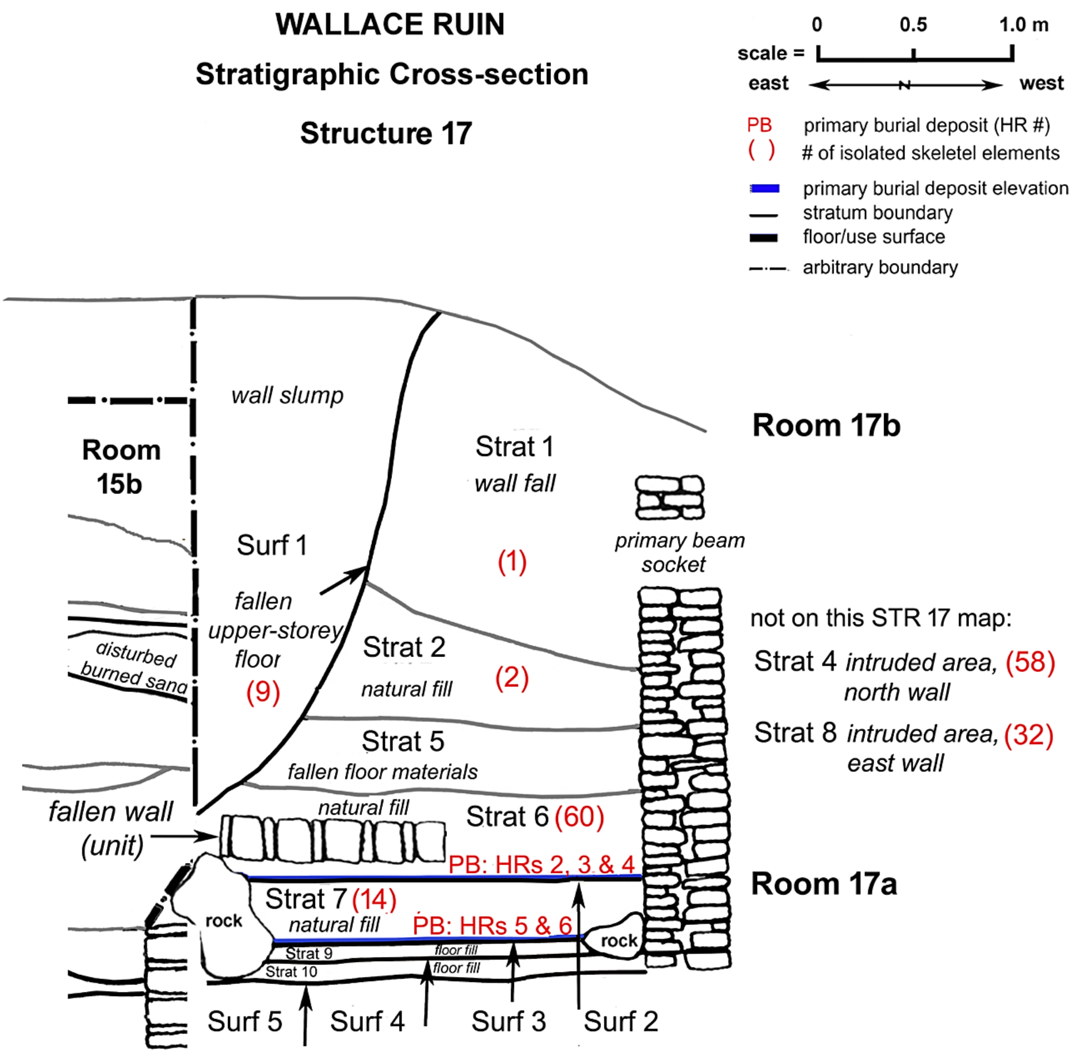


Fig. A.6: Stratigraphic profile of Structure 17, with summary data regarding locations of human remains.

Table A.4: Chronological sequence of major events regarding Structure 17 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey walls; north wall, shared with STR 7, south wall, shared with STR 18; appended to the west wall of the Phase 1 great house (STRs 14 and 15).
	Construction of the original prepared floors (Surf 1, 17b; Surf 5, 17a).
	No doorways; hatchway probably located in SW corner of Surf 1.
	Development of Surf 4, an ashy fill use-surface ("floor"), Room 17a.
PIII	Phase 4 construction of the second prepared floor (Surf 3) in Room 17a.
	Deposits of primary burials HR 5 and HR 6 upon Surf 3.
	Gradual accumulation of silty fill (Strat 7) drifting down through Surf 1 (17b) and covering HRs 5 and 6.
	Complete covering of HR 5 and HR 6 by silty fill.
	Development of Surf 2, a use-surface ("floor") in Room 17a.
	Deposits of primary burials HR 2, HR 3, HR 4 upon Surf 2.
	Gradual accumulation of silty fill (Strat 6) drifting down through Surf 1 (17b).
	Complete/partial covering of HRs 2, 3 and 4 by silty fill (Strat 6).
	Collapse of east wall onto Surf 3 and Strat 6 (different zones of 17a) within the eastern 2/3 of 17a; many stones blackened or orange (oxidized) from exposure to intense heat.
	Dry-bone damage: indirect, compression fractures of HR 6 cranium and slight direct, dry-bone damage to HR 3 left os coxae produced by fallen east wall.
	Intense fire within upper-storey Room 17b; collapse of STR 17 roofing materials (Strat 3) onto heavily burned upper-storey floor (Surf 1); charring of Surf 1 wood and oxidation of adobe flooring (Strat 5).
	Partial collapse of Surf 1 construction materials (wood and ash, adobe chunks, Strat 5) onto Strat 6 in all but the southeast corner of Room 17a.
	Heat exposure affecting bone and shrouding in the region of HR 4 knees.
	Human intrusion through the exterior, west wall of 17a at the elevation of the initial 17a floor (Surf 5) through lower Strat 6.
	Intentional, human disturbance of the superior skeleton of primary burial HR 4.
	Possible unintentional human disturbance of 2-3 infant skeletons located near the north (Strat 4) wall of 17a; mortuary locations unknown.
	Natural fill accumulations (Strat 2).
	Collapse of upper-storey walls (Strat 1) and all, or the rest, of Surf 1 and the STR 17 roof.
	Skeletised remains (ISE) moved across and between strata and structures by humans or burrowing animals: Strat 1 (1); Strat 2 (2); Surf 1 (10); Strat 4 (57); Strat 6 (46); Strat 7 (12); Strat 8 (27).

SOUTH SUITE

The four structures that comprise the South Suite were produced by internal partitioning of a large structure erected over foundation trenches, or footers (Bradley, 1988:13). As is the case for each Phase 3 structure, the Suite's two-storey walls are composed of compound masonry consisting of an outer and inner layer of overlapping sandstone slabs. The presence of hearths, inter-connecting ground and upper-storey passageways and a large T-shaped doorway indicate that this suite initially functioned as a domicile.

STRUCTURE 18

The Phase 3, two-storey Structure 18 is situated in the northwest corner of the South Suite (Figs. A.7, A.8; Tab. A.5). The incorporation of a hearth in the northwest corner of Surf 4 indicates that Room 18a, the ground-storey room, was used for habitation purposes initially. The refined appearance and configuration of the 18a side of the doorway may signal a change of use that involved a more formal expression of ritual activities; however, when this occurred is indeterminate.

Structure life history

- Surfs 3 and 4 (Room 18a) date to the Pueblo II Period.
- Surf 2 (Room 18a) dates to the Pueblo III Period.
- The evidence from Surf 2 represents the final use of 18a, excluding the canid intrusion event.
- The clay chunk layer (Strat 4) of the fallen roof rests directly upon Surf 1.
- STR 18 contains no midden deposits.
- The appearance of the masonry blocking (plugging) on the 18a side of the 18a/19a doorway (Fig. A.7) is distinctly different from that observed in all other doorways within the great house.
- The refinement of the masonry work and the extent of inset on the 18a half of its east doorway is consistent with a niche, or maybe a shrine.
- The timing of the blockage of the upper and lower-storey doorways in the east wall is unknown, as is whether either or both was co-incident with the insertion of the south doorway (18a/26a).
- The 18a/26a (south wall) doorway is open.

•Surf 1 collapsed at some point after the canid intrusion into 18a; the timing of the collapse of the STR 18 roof fall onto Surf 1 is indeterminate.

Figure A.7: Photographs of the distinctly different appearances of the masonry used to block the west (18a) and east (19a) sides of the 18a/19a doorway. The appearance of the 19a side is representative of plugged doorways observed at Wallace Ruin.

Human skeletal remains

•Structure 18 contains the remains of two undisturbed primary burials, the scattered and commingled bones from three Individual Links, one articulated anatomic unit (3rd-8th thoracic vertebrae), and 42 isolated skeletal elements; a few ISE may belong to one or more of the 18a iLinks but cannot be re-associated with reasonable confidence.

•All primary burial deposits (including iLinks) are located on Room 18a floors (4) or within a subfloor pit (1).

•HR 12 rests directly upon Surf 4 in the southwest quadrant of Room 18a. This foetus/neonate is not covered by a concentration of cultural refuse (i.e., midden fill), but the overlying fill (Strat 8) contains a scatter of Mancos and McElmo B/w sherds.

•HR 9 is within an oval subfloor pit situated in the north-west corner of Room 18a between the two Pueblo II floors; this intrusive pit was cut through Surf 3 and into a thick layer of AD 1100s cultural refuse (Strat 8); the bottom of the pit is just above Surf 4. The size and configuration of Feature 7 suggests that it was created specifically as a burial pit (grave) for a young child rather than the appropriation of an existing pit.

•Bones from Individual Links 835 and 836 (children), iLink 867 (adult female) and possibly an infant rest upon (Pueblo III) Surf 2.

•95% (172/181) of the bones attributable to iLinks 835, 836 and 867 are on Surf 2, six (6) iLink bones are from the overlying Strat 6, though just above Surf 2; (3) bones are re-associated from the fallen roof stratum.

•A right parietal fragment (18.54.988) from adult Cranial Link 145 is in natural fill within the raised-sill doorway between Rooms 18a and 26a.

•The bones on Surf 2 are in complete disarray; the only exception consists of five articulated thoracic vertebrae from the adult iLink 867.

•43% (78/181) of the bones attributable to iLinks 835, 836 and 867 have canid damage (tooth marks and gnawing).

•The presence of willow mats (and one bark mat) similar to those associated with undisturbed primary burials at Wallace Ruin suggests that each iLink is a primary burial deposit that was extensively disturbed by canids while in an advanced stage of skeletisation.

•The discovered locations of a Mesa Verde B/w mug and the remains of organic mats suggest that at least two iLinks were deposited within the north-west quadrant of 18a, though some 30 to 100 years later than the interment of HR 9 in that (subfloor) location.

•The movement of bones from Surf 2 into Strat 6 is best explained by the extensive evidence of animal burrowing between strata.

•It is indeterminate whether parietal fragment 18.54.988 was moved to its discovered location within the 18a/26a doorway by scavenging canids or subsequently by burrowing animals.

•The 17 ISE dispersed across the clay chunk level of the fallen roof (Strat 4) are fragmentary and extensively weathered (Stage 2-4); several have canid damage. Their poor preservation indicates prolonged exposure.

•One ISE to iLink 836 and two long bone fragments that probably belong to iLink 867 are not weathered though 2 have canid damage; it appears that these bones were moved upwards by burrowing animals.

•The rooftop location of the 14 remaining ISE suggests two alternatives: 1) they were accidentally dropped on the roof by humans during the re-location of disturbed remains from the South Suite to the North Suite; or,

2) these ISE were first transported into 18a through the open18a/26a doorway, then moved onto the fallen roof by burrowing animals after the collapse of the roof onto the upper-storey floor.

•Inter-mural Links: ISE Cranial Link 145 (Rooms 6a, 7a, 26a); ISE Fibulae Link 797 (Rooms 18a and 27a)

•The association and sequence regarding the remodelling of the 18a/19a doorway and the deposit of primary burials within Room 18a is unknown.

Determinations of chronological period for human remains

Room 18a is the only excavated room containing primary burial deposits from either the Pueblo II or Pueblo III use of Wallace Ruin. HR 9 and HR 12 are from the Pueblo II Period, based on stratigraphic evidence and associated material culture. iLinks 835, 836 and 867 date to the Pueblo III Period, based on stratigraphic evidence and associated material culture. All ISE from STR 18 are assigned to the P3WR subset based on stratigraphic evidence as well as the taphonomic characteristics shared with bones from secure Pueblo III contexts.

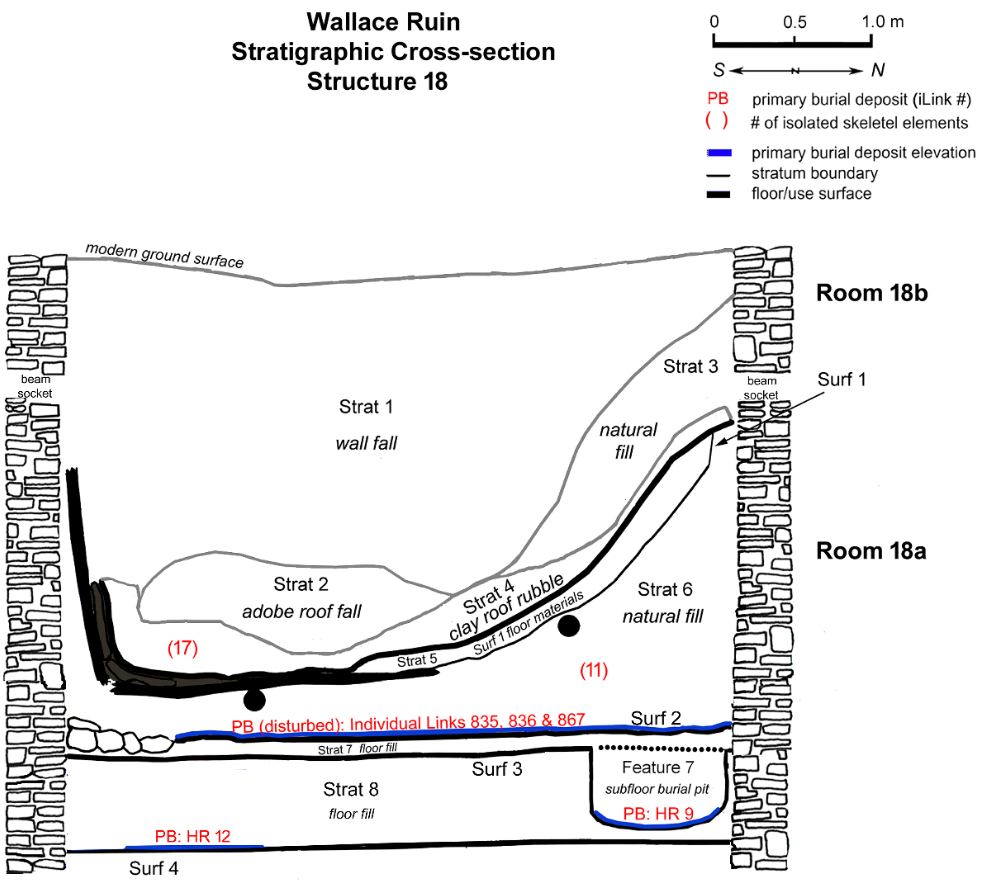


Fig. A.8: Stratigraphic profile of Structure 18, with summary data regarding locations of human remains.

Table A.5: Chronological sequence of major events regarding Structure 18 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey walls within NW corner of the South Suite; north wall shared with STR 17; east wall shared with STR 19 and a short section of STR 15; south wall shared with STR 26.
	Construction of the original prepared floors (Surf 1, 18b; Surf 4, 18a).
	Construction of raised-sill doorways in east wall shared with STR 19 (18a/19a; 18b/19b); no Surf 1 hatchway; roof hatchway existence unknown.
	Deposit of primary burial HR 12 upon Surf 4.
	Accumulation of a thick layer of floor fill comprised of sandy-silty sediments that also contained scatters of Mancos and McElmo Black-on-white sherds.
	Construction of the second prepared floor (Surf 3) in Room 18a.
	Insertion of an intrusive subfloor burial pit (F. 7) between Pueblo II floors in NW corner of Room 18a; oval pit cut through Surf 3 and most of Strat 8; bottom of pit just above Surf 4.
	Deposit of primary burial HR 9 within Feature 7; burial pit re-filled with sediments to the level of Surf 3.
	Accumulation of a thin layer of floor fill with few diagnositic artefacts.
PII-III	Insertion of a raised doorway (18a/26a) in the south wall.
	18a/19a (east) doorway remodelled; niche-like appearance on 18a side.
PIII	Development of Surf 2, a use-surface ("floor") in Room 18a.
	Deposit of at least three primary burials (Individual Links 835, 836 and 867) on Surf 2.
	Intrusion of canids into 18a, probably through the 18a/26a doorway.
	Extensive damage, scattering and commingling of largely skeletised remains by canids.
	Possibly, circulation of skeletised bones by canids between 18a and 26a.
	Rough and possibly incomplete plugging of 18a/26a doorway.
	Sealing of disorganised skeletal remains within 18a.
	Possibly, as many as 14 of the ISE in roofing clay chunks (Strat 4) were accidentally dropped on or near the STR 18 roof as disturbed remains from 26a and possibly unexcavated rooms were transported to the South Suite.
PIII +	Accumulation of silty natural fill (Strat 6).
	Collapse of the burning/smoldering upper-storey floor (Surf 1) onto Strat 6.
	Collapse of roofing materials directly upon Surf 1 (Strat 2, Strat 4).
	Collapse of upper-storey walls (Strat 1); accumulation of natural fill (Strat 3).
	ISE moved across and between strata and structures during animal burrowing; 18a/26a doorway (1); Strat 4 (at least 3) and Strat 6 (11).

STRUCTURE 19

The Phase 3, two-storey Structure 19 is situated in the northeast corner of the South Suite (Fig. A.9, Tab. A.6). Although lacking hearths, both rooms initially functioned as active living spaces. Possibly after a fire in 19b, both 19a and 19b were sporadically used for trash deposits during the occupation and then re-use of Wallace Ruin.

Structure life history

- Mancos Black-on-white (Pueblo II) sherds are the only diagnostic artefacts associated with Surf 1 (19b).
- No floors or use surfaces were added during the Pueblo III Period; there is no evidence of a Surf 1 hatchway.
- Strata 2 and 3 cultural refuse accumulations post-date those of Surf 1.
- Following its collapse onto Strat 3, the Surf 1 clay chunk layer was accessible from Room 27a via the open 19a/27a doorway.
- An animal burrow that penetrated the superior north corner of the 18a/19a doorway disturbed materials on or near Surf 1 of 19a; this burrow is roughly the same elevation as the fallen Surf 1 and the overlying roof clay stratum (Strat 4) of STR 18.
- A raised-sill doorway in the east wall of Room 19b provided the only upper-storey entrance into the South Suite prior to blocking with masonry. The timing of this plugging is unknown.
- The date of the informal passageway (19a/27a) in the south wall of Room 19a is indeterminate. It may represent a collapsed doorway or a “punched-through” hole coincident with the intrusion into Room 27a.

Human skeletal remains

- Structure 19 contains one primary burial deposit, no articulated anatomic units, and nine ISE; Clavicle 19.19.731 is re-associated to HR 11 of 27a.
- Foetus/neonate HR 8 rests directly upon Surf 1, the upper-storey floor, and is unaccompanied by non-perishable grave goods. The bones are generally in a good state of preservation.
- HR 8 is not overlain by a concentration of cultural refuse.
- There are no disturbed primary burial deposits in STR 19.

•Seven ISE that are either on or just above Surf 1 are dispersed across the room; two ISE are just below Surf 1 in Strat 3.

•Three ISE on Surf 1 are weathered and two have canid damage; clavicle 19.19.731 (to HR 11) is undamaged.

•The nine ISE represent individuals from all age classes.

•Inter-mural Links: HR 11 (27a); possible Fibula Link 109 (6a)

Determinations of chronological period for human remains

The infant HR 8 is assigned to the Pueblo II Period based on stratigraphy and ceramic evidence associated with Surf 1 and the overlying Strat 2. In contrast, all ISE are allocated to the Pueblo III Period based on the absence of Pueblo II primary burials of the same age class in STR 19, Pueblo III taphonomic characteristics, and at least one re-association to bones from definite Pueblo III contexts. Based on AMS results, the clavicle re-associated to HR 11 of Room 27a dates to the early AD 1200s. This bone, discovered on Surf 1 in the southeast quadrant of 19a, was apparently moved through the open 19a/27b doorway during animal burrowing. This event would have occurred after the intentional disturbance of HR 11 in prehistoric times. The damaged and weathered bones on or just above Surf 1 may have been moved through the burrow that penetrated the 18a/19a doorway after exposure on the STR 18 roof.

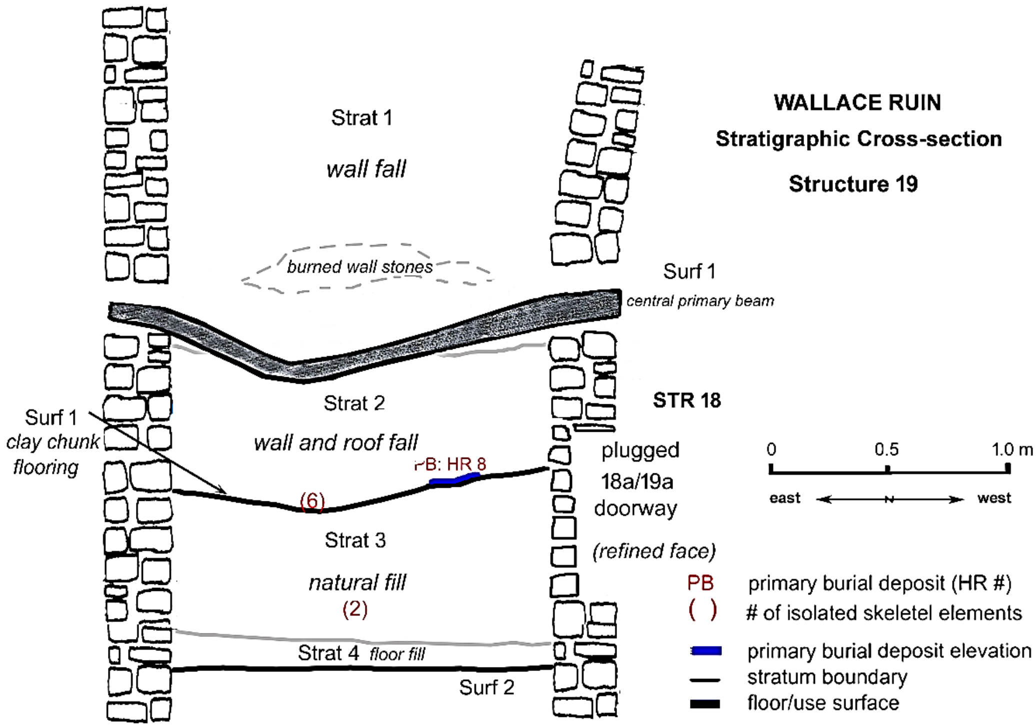


Fig. A.9: Stratigraphic profile of Structure 19 with summary data regarding locations of human remains.

Table A.6: Chronological sequence of major events regarding Structure 19 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of the two-storey STR 19 in the NE corner of the South Suite; appended to the south wall of (Phase 1) STR 15; west wall shared with STR 18; south wall shared with STR 27.
	Construction of the original prepared floors (Surf 1, 19b; Surf 2, 19a).
	Construction of raised-sill doorways: 18a/19a; 18b/19b; 19b/27b; east (exterior) doorway in Room 19b possibly T-shaped; unknown if doorway 15b/19b was constructed during Phase 1 or Phase 3; no evidence of a Surf 1 hatchway; roof hatchway existence unknown.
	19b: Deposit of primary burial HR 8 on the upper-storey floor (Surf 1).
PII-III	19b: All upper-storey doorways blocked ("plugged" with masonry).
	19a: 18a/19a doorway blocked; 19a side is flush with west wall.
	19a: Informal passageway created in the south wall of 19a (19a/27a).
	Acccumulations of mixed fill (natural and cultural) above the upper and ground-storey floors. Sherds in lower elevations of Strata 2 and 3 are Pueblo II wares; upper elevations of each stratum include Mesa Verde Black-on-white sherds.
PIII +	Collapse of Surf 1 and any overlying strata onto Strat 3; clay chunk flooring elevation is roughly 20 cm above the sill of the open doorway 19a/27a.
	Movement of the re-associated HR 11 left clavicle (19.19. 731) and probably Surf 1 (6) and Strat 3 (2) ISE onto or near the fallen Surf 1 during animal burrowing; either through the open 19a/27a passageway or via a burrow traced through the blocked west 18a/19a doorway.
	Structure collapse (Strat 1 wall fall)

STRUCTURE 26

Rooms 26a and 26b are situated in the southwest corner of the South Suite (Figs. A.10; A.11; Tab. A.7). A large, floor-level, T-shaped doorway in the south wall of Room 26a provided easy access from the building exterior. This portal was the only ground-storey entrance to the Suite after the construction of the South Arm c. AD 1140.

Structure life history

- Surfs 2a and 2b are Pueblo III use-surfaces (floors).
- The only stratum containing a thick accumulation of cultural refuse dates to the Pueblo II occupation (Strat 10).
- Some 2/3 of the 26a/27a doorway remained open after partial plugging.

•The exterior, south T-shaped doorway and doorway 18a/26a were plugged when discovered during research excavation.

•The probable scenario is that: 1) the T-shaped doorway was open or partially blocked at the time of the canid intrusion since there was no other ground-storey entrance into the Suite after c. AD 1140; and 2) the exterior and 18a/26a doorways were blocked after the canid intrusion.

•Access to 26a by ladder was impossible once dismantled roofing materials were deposited over the Surf 1 (26b) hatchway sometime during the Pueblo II or Pueblo III Periods.

•A large, jumble pile of sandstone slabs overlies the central-north section of the room. This pile appears to developed when the northern primary beam collapsed and brought down a large section of the west wall.

Human skeletal remains

•Structure 26 contains 1 primary burial deposit, potentially one articulated anatomic unit and 124 isolated skeletal elements.

•All skeletal remains are located within the confines of Room 26a.

•Primary burial HR 10 was deposited on Surf 2b, the lower of the two Pueblo III use surfaces. This older adolescent female is accompanied by Mesa Verde Black-on-white vessels, in addition to other objects.

•HR 10 is not overlain by a deposit of cultural refuse. She may have been deliberately covered with an informal arrangement of small slabs. Overlying wall fall contributes some uncertainty to this observation.

•74 ISE are dispersed across the Surf 2a use-surface.

•46% (34/74) of the ISE on Surf 2a have definite evidence of canid scavenging in the form of tooth marks or gnawing, and 16 more elements have damage suggestive of canid scavenging. The prevalence is slightly less than half (47%) when ISE from Strat 4 (4/7), Strat 7 (3/11) and Strat 8 (12/27) are included.

•Two cervical vertebrae, eight fused thoracic neural arches, and four centra (PL 21) from a young child are tightly clustered though not in articulation. One has a canid tooth puncture. Another thoracic vertebra (PL 6) that matches well with this unit though located some distance away in the SW corner of the room has canid damage as well. Considering the developmental immaturity of these elements, it may be that the PL 21 vertebrae remained in articulation through the scavenging event but were subsequently displaced during animal burrowing. Otherwise, there are no articulated ISE in Structure 26.

•A woven willow mat is situated in the southwest quadrant of 26a on Surf 2a. An adult vertebra (PL 10) and two immature permanent molars (PL 15) rest directly upon the mat, an adult rib (PL 17) touches the mat, and a child's temporal bone (PL 16) is partly covered by the mat (Fig. A.9). All three bones have canid damage.

•Inter-mural Links: Only 14 of the 124 (11%) ISE are of an element type or in a condition suitable for pair-matching. A small parietal fragment (26.55.1292) may belong to Cranial Link 145 based on cranial thickness and development, but there no refitting edges.

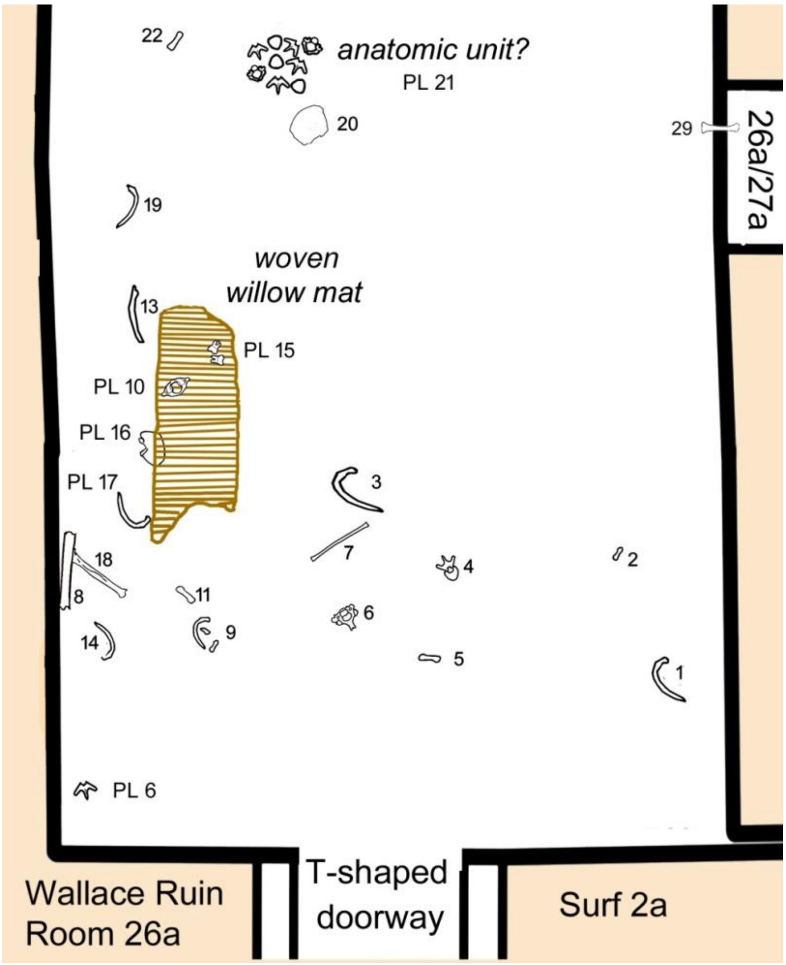


Fig. A.10: Plan map of the south half of Room 26a showing the locations of (selected) disturbed, dispersed and commingled human remains associated with Surf 2a, the upper Pueblo III use-surface. The willow mat overlies and is overlain by bones from at least one adult and one child.

Determinations of chronological period for human remains

HR 10 of Surf 2b dates to the Pueblo III Period based on stratigraphic evidence and associated grave goods. In addition, AMS results indicate that she probably died in the 1220s, though possibly as late as AD 1240s. All ISE in Structure 26 (Room 26a) are allocated to the Pueblo III Period as well. The ISE from the inferred, disturbed primary burials deposits of the overlying Surf 2a post-date the deposit of HR 10, though whether by a matter of weeks or years is unknown. ISE in overlying and underlying strata are inferred as moved into their discovered locations from Surf 2a during animal burrowing. In several cases regarding ISE with tooth punctures, it is evident that this action followed the intrusion of scavenging canids. By way of example, Os Coxae fragment 26.55.1290 of Strat 7 is the antimere of 26.28.1038, which is located on the overlying use-surface Surf 2b.

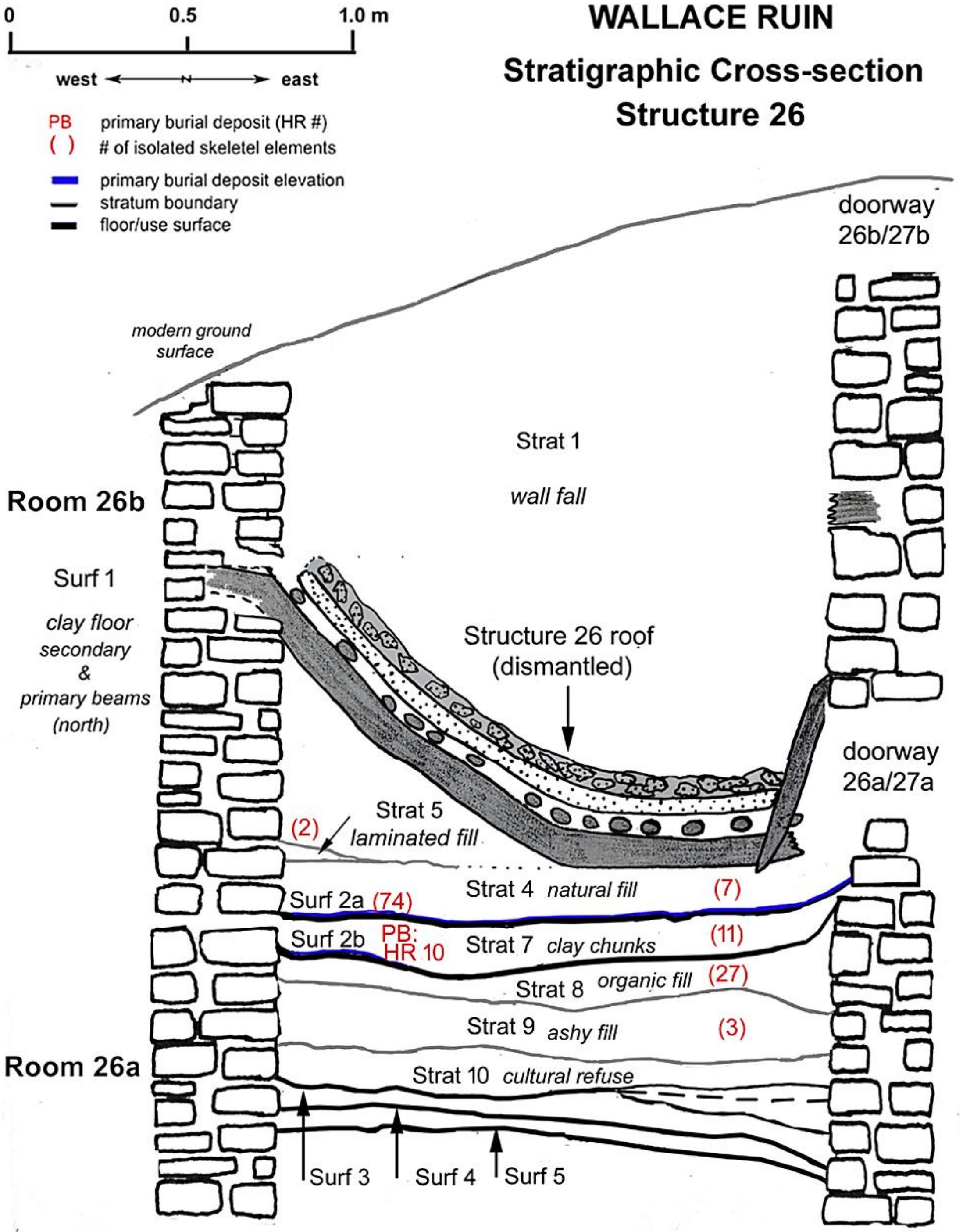


Fig. A.11: Stratigraphic profile of Structure 26 with summary data regarding locations of human remains.

Table A.7: Chronological sequence of major events regarding Structure 26 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey walls in th SW corner of the South Suite; north wall shared with STR 18; east wall shared with STR 27.
	Construction of upper and ground-storey floors (Surf 1, 26a; Surf 5).
	Construction of a T-shaped doorway in the south (exterior) wall of Room 26a; raised-sill doorways in east wall shared with STR 27 (26a/27a; 26b/27b); hatchway in the SE corner of Surf 1; roof hatchway existence unknown.
	Recurrent sequence of floor fill accumulations (Strata 9 and 10) overlain by prepared floors (Surfs 3 and 4)
PII-III	Insertion of an raised doorway (F. 9) in the south wall between 18a and 26a.
	Structure 26 roof dismantled; roofing material deposited over the Surf 1 hatchway blocks passage between 26a and 26b.
PIII	Accumulation of a thick layer of organic fill (now ochre yellow) comprised of disintegrated plant material (Strat 8).
	Development of a use-surface (Surf 2b) on the upper contact surface of Strat
	Deposit of primary burial HR 10 on Surf 2b in the NW corner of Room 26a .
	Sandstone slabs and building blocks deposited over/within the proximity of HR 10; unknown if this layer created at deposition of HR 10 or subsequently.
	Construction debris (clay chunks) deposited within the south 2/3 of 26a (Strat 7); deposit pinches out before reaching the proximity of HR 10.
	Unknown number of primary burials and a willow mat deposited upon an informal use-surface (Surf 2a) constituting the upper contact zone of the clay chunk layer.
	Complete disturbance of (inferred) primary burials by scavenging canids; 74 damaged and commingled ISE on Surf 2a represent individuals from all age classes.
	Re-deposition of an unknown number of bones from the disturbed primary burials to the North Suite (inferred).
	All doorways blocked or partially blocked; lower boundary of the semi-blocked 26a/27a doorway is at the level of the upper contact zone of Strat 7.
	Accumulation of a thick layer of soft, brown natural fill (Strat 4) across the room and then a thin layer of laminated fill (Strat 5) in the SW quadrant of 26a.
	Structure collapse; the fall of Surf 1 is possibly co-incident with the collapse of a large section of the west wall.
	Movement of skeletised remains across and between Strata 4-8 and other South Suite rooms by burrowing animals.

STRUCTURE 27

The two-storey Structure 27 is in the southeast corner of the South Suite (Fig. A.12, Tab. A.8). A large hearth in 27a indicates that this room was initially used for habitation purposes. Bradley infers that the addition of an expedient hearth and a transecting wall within Room 27b during Pueblo III times is more suggestive of limited use than full-scale habitation. See Chapter 11 for a detailed discussion concerning the intentional disturbance of HR 11's mortuary context.

Structure life history

- With the construction of the Annex c. AD 1140, Room 27a was accessible through the 26a/27a doorway only.
- Room 27b has no exterior doorways or a Surf 1 hatchway.
- Structure 27 contains no midden deposits; cultural deposits consist of construction debris or accumulations of organic materials.
- Surf 2 is the only Pueblo III floor (use-surface) in Room 27a.
- An intrusive subfloor burial pit (F.7) was cut into Surf 2; the base cuts into cultural refuse that pre-dates STR 27.
- Associated artefacts on the floor of the pit date to the Pueblo III Period.
- At some point, Surf 2 (and the pit) was overlain by a thick deposit of constructional fill containing Mesa Verde-Black-on-white sherds.
- The temporal and social relationship between the Pueblo III use of Rooms 27a and 27b is unknown.
- The deposit of constructional fill (Strat 7) represents the last use of 27a, excluding the subsequent intentional intrusion through the south wall.
- A large, irregular hole (app. 50 w x 60 h cm) was "punched through" the double-coursed, exterior south wall; its lower margin is just above the elevation of the upper contact zone of Strat 7.
- An expedient hearth on Strat 7 near the vicinity of the hole may be associated with the intentional intrusion through the south wall.
- This hole was not sealed with masonry; whether an organic barrier was used is indeterminate.
- Fill and fallen Surf 1 materials are undisturbed along the entire south wall above the level of Strat 7.

•It is indeterminate whether the informal passageway in the north wall (19a/27a) was inserted prior to the human intrusion into 27a or if it is a second “punched-through hole” associated with this event.

Human skeletal remains

•Structure 27 contains 1 primary burial deposit and no articulated anatomic units. The 44 isolated skeletal elements from Strata 4, 6 and 7 do not include 43 ISE from Strat 7 that are re-associated to HR 11.

• Primary burial HR 11 was deposited within an oval subfloor pit situated the north half of Room 27a, just north of the east-west axis between the east and west ground-storey doorways. This intrusive pit was cut through Surf 2; the base of the pit cuts into cultural refuse that pre-dates the construction of STR 27. The size and configuration of Feature 7 suggests that it was created specifically as a burial pit (grave) for an adult male rather than the appropriation of an existing pit.

•The adult male HR 11 is accompanied by a Mesa Verde Black-on-white bowl, in addition to other objects.

•The burial pit and skeletonised remains of HR 11 were deliberately disturbed by humans who entered 26a through the hole in the south wall. All bones save those from the lower limbs were removed from F.7 and apparently placed upon the upper contact zone of Strat 7 (construction debris). Most of the removed bones were then re-interred in a mixed deposit that included disturbed materials from Strat 7, numerous arrowheads and probably pit fill sediments that covered the skeleton prior to this disturbance.

•At least 15 bones from HR 11 remained dispersed across the upper contact zone of Strat 7, beyond the boundary of the burial pit.

•HR 11 bones have no damage suggestive of canid scavenging.

•10 the 44 ISE from 27a (excluding those to HR 11), have damage consistent with canid scavenging; these include 2 ISE from Strat 4, 3 ISE from Strat 6 and 5 ISE from Strat 7.

•Inter-mural links: Cranial Link 145 (27.214.1276 & 27.226.1846 6a, 7a and 18a), Fibula Link 797 (18.13.797 and 27.115.1138); possible Scapula Link 742 (iLink 867/18.18.742 and 27.205.113)

Determinations of chronological period of human remains

R 11 is Pueblo III in age based on stratigraphic and ceramic evidence. In addition, AMS results indicate deposition within the early AD 1200s. All ISE are allocated to the Pueblo III subset based on stratigraphic and taphonomic evidence, and in two or three cases, skeletal re-associations to antimeres confidently dated as Pueblo III. Apparently, some or all of the scattered ISE in Strata 4and 6 were moved from their original 27a location on Strat 7 to higher elevations during animal burrowing. The deliberate disturbance of HR 11 occurred after skeletisation but before the development of 27a fill units that overly Strat 7 strata or the collapse of Surf 1. For reasons explained in Section 8…, this intrusion probably occurred no later than the late AD 1200s but almost certainly prior to Montezuma County's historic period (c. AD 1800s).

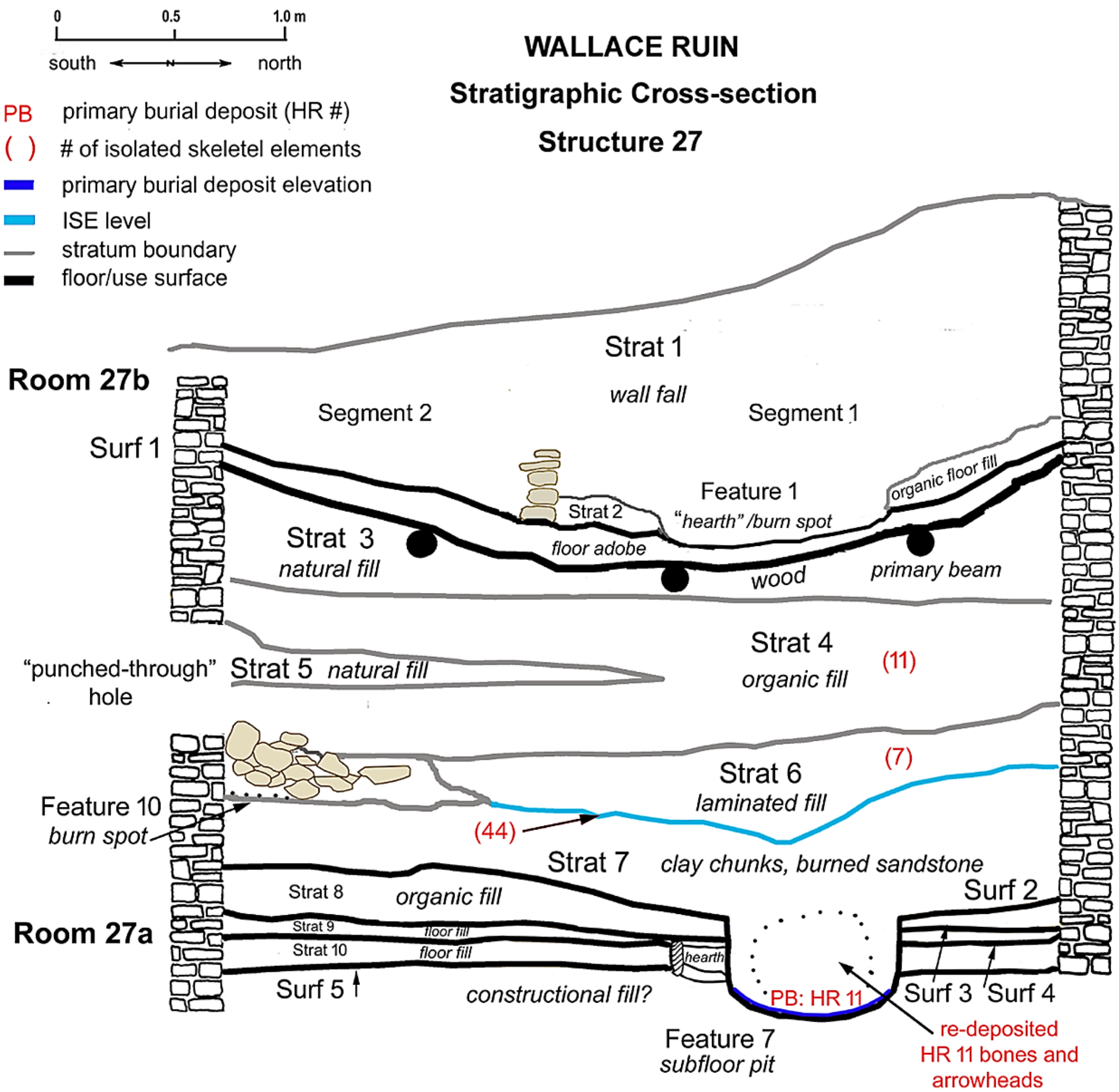


Fig. A.12: Stratigraphic profile of Structure 27 with summary data regarding locations of human remains.

Table A.8: Chronological sequence of major events regarding Structure 27 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey walls in the SE corner of the South Suite; north wall shared with STR 18; west wall shared with STR 26.
	Construction of upper and ground-storey floors (Surf 1, 27b; Surf 4, 27a).
	Construction of a T-shaped doorway in the east wall of Room 27a; raised-sill doorways (19b/27b; 26a/27a; 26b/27b;) no Surf 1 hatchway; roof hatchway existence unknown.
	Exterior T-shaped doorway in 27a blocked when the Annex is appended to its east wall c. AD 1140.
PIII	Development of a use-surface (Surf 2) over yellow organic fill (Strat 8).
	East-west partition of Room 27b with a stone wall located just south of the east 27a/27b doorway; installation/use of a Surf 1 hearth.
	Insertion of a subfloor pit (F. 7) in the north half of Room 27a that cut through Surf 2; base cut into deposits that predate STR 27.
	Deposit of primary burial HR 11 and grave goods within Feature 7.
	Deposit of a thick layer of construction debris containing cultural refuse (sherds, etc.) throughout 27a (Strat 7);accessed through the 26a/26b doorway; possibly, co-incident with the deposit of construction debris in Room 26a.
	Partial blocking of the (west) 26a/27a doorway level with the upper contact zone of Strat 7 of 27a.
	Canid-damaged ISE adjacent to 26a/27a doorway and central-north region of 27a transported (apparently) from Surf 2a of Room 26a onto upper contact surface of Strat 7, possibly by scavenging canids.
PIII +	Intentional intrusion into Room 27a through the south (exterior) wall; base of this "punched-through hole" (F. 10) is just above the upper contact level of Strat 7; removal of Strat 7 fill immediately above the subfloor burial pit (F.7).
	Nearly complete removal of the skeletised remains of HR 11; bones are initially placed upon the upper contact zone of Strat 7.
	Informal re-deposit of most bones within the burial pit, though some elements remain dispersed upon the upper contact zone of Strat 7.
	Possible expedient hearth (Feature 6, burn spot) established on the upper contact zone of Strat 7 near the (F. 10) hole in the south wall.
	Four fragmentary ISE on the perimeter of F.6 are charred, probably unintentionally. Possibly, these ISE were previously moved into 27a by canids.
	Unknown if the informal passageway in the north wall (19a/27a) is a second "punched-through hole" dating to this intrusion or a pre-existing opening; the elevation of the lower boundary is higher than the upper contact of Strat 7.
	Natural fill (Strat 5) accumulates by the unsealed hole in the south wall.
	Laminated (washed-in) fill (Strat 6) accumulates in the vicinity of the 26a/27a doorway and in the vicinity of the hole in the south wall.
	Organic fill (composed of sticks, etc) with quantities of artefacts accumulates in the north 1/3 of 26a; this stratum shares characteristics of Strat 2 (organic floor fill) that overlies Surf 1 of 27b.
	Accumulation of natural fill (Strat 3) and structure collapse (Surf 1 and Strat 1).
	ISE moved into Strata 4 (11) and 6 (7) during animal burrowing.

ANNEX

STRUCTURE 29

Structure 29 is a small, one-storey room located at the south end of the Phase 3a Annex, constructed c. AD 1140s (Fig. A.13; Tab. 9). The size of this room and the absence of doorways indicate that it originally functioned as a storage room.

Structure life history

- The only floor/use surface dates to the Pueblo II use of the structure.
- However, ceramic evidence indicates that all fill units developed after AD 1180 (Bradley, 2010).
- Strat 3 (organic fill) contains 38 Mesa Verde Black-on-white sherds and numerous turkey gastroliths (gizzard stones).
- A large, intrusive subfloor burial pit (F.1) was cut into Strat 3; the base cuts into cultural refuse that pre-dates the Annex.
- Feature 1 contains no ceramic vessels; however, pit fill comprises a mixture of natural sediments and Strat 3 fill, including numerous turkey gastroliths and 3 Mesa Verde Black-on-white sherds.
- The burial pit was not overlain by a concentration of cultural refuse.

Human skeletal remains

- Structure 29 contains two entwined primary burials, but no articulated anatomic units or isolated skeletal elements.
- HR 13 is an adolescent female and HR 14 is an older adult female.
- Skeletal articulations are in close anatomic position, with only minor displacements from root invasion or burrowing animals.
- The burial pit contains the only certain double-burial at Wallace Ruin.
- The large size and configuration of the burial pit suggests that it was created specifically as a burial pit for these two adult-sized individuals rather than the appropriation of an existing pit.

Determination of chronological period for human remains

Both HR 13 and HR 14 are classed as Pueblo III primary burial deposits even though there are no associated Mesa Verde Black-on-white grave goods. This determination is based on stratigraphic evidence, the presence of Mesa Verde B/w sherds, and the occurrence of numerous turkey gastroliths throughout burial pit fill. It is possible that the three Mesa Verde B/w sherds were moved into this pit from a higher elevation by a burrowing animal. However, it is improbable that this activity would have moved such a large number of gastroliths without disturbing either skeleton.

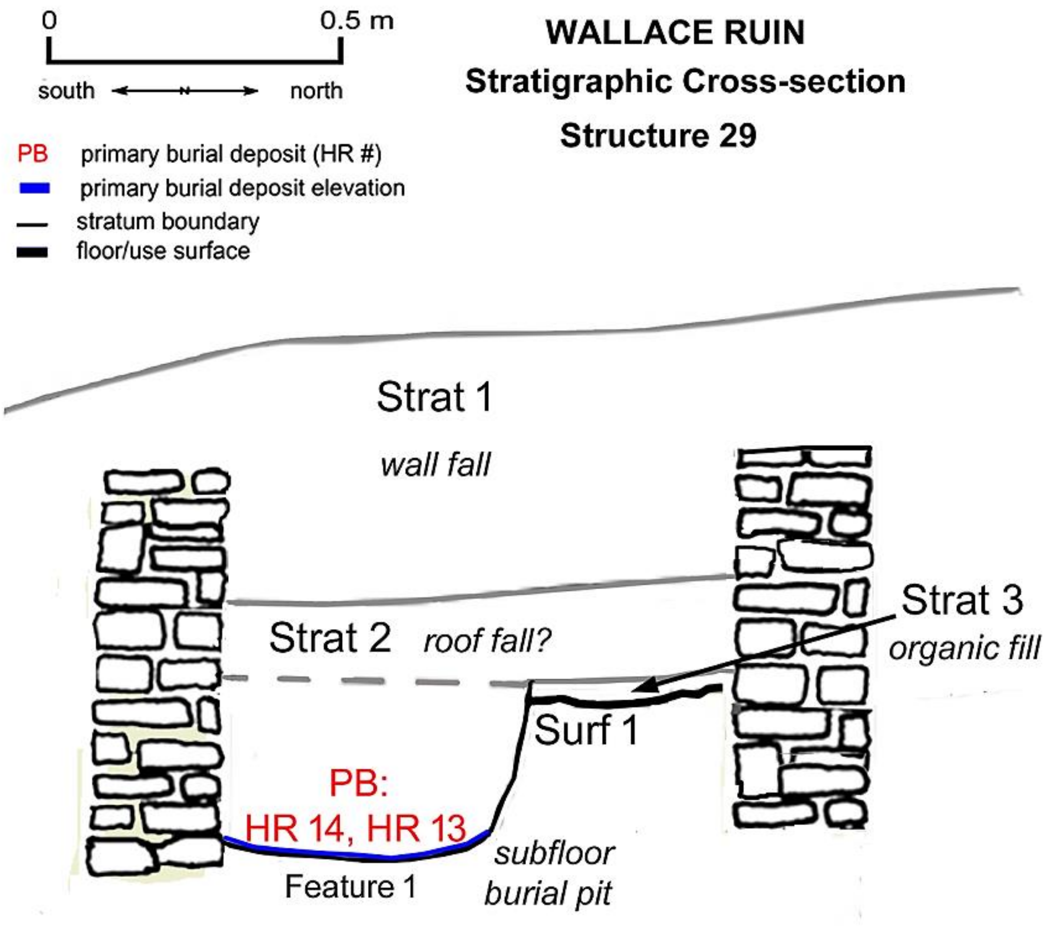


Fig. A.13: Stratigraphic profile of Structure 29 with summary data regarding locations of human remains.

Table A.9: Chronological sequence of major events regarding Structure 29 (Phase 3a); those involving human remains are italicised.

Period	Event
PII	Construction of a small, single-storey structure at the south end of a 3-4 structure arm (Annex) appended to the SE corner of STR 27.
	Construction of Surf 1, a prepared floor.
	No evidence of a doorway; roof hatchway existence inferred.
PIII	Accumulation of (yellow) organic fill, including numerous turkey gastroliths and Mesa Verde Black-on-white sherds (Strat 3).
	Large subfloor pit along south wall (Feature 1) cut into Strat 3; base cut into cultural refuse that pre-dates Annex.
	Primary burial deposits (HR 13 and HR 14) interred as a double-burial within F.1 subfloor pit; corpses covered with mixed sediments (natural and Strat 3). No grave goods.
PIII +	Possible roof fall stratum (Strat 2) covers Strat 3.
	Wall collapse (Strat 1).

STRUCTURE 30

The possibly two-storey Structure 30 is located on the north end of the Annex (Figs. A.14, A.15; Tab. A. 10). It was used for habitation purposes during the Pueblo II occupation, but it appears to have been used for ritual functions during the Pueblo III Period.

Structure life history

- The only floor/use surface dates to the Pueblo II use of the structure.
- Cultural discard within Strat 3 includes several objects in useable condition, including one McElmo Black-on-white effigy vessel (Fig.A.14). Bradley (2010:38-39) interprets these artefacts as “intentional and possibly resulting from ritual activities, perhaps related to feasting.”
- Cultural fill Strata 2 and 3 contain relatively high proportions of Mesa Verde Black-on-white sherds.

Fig. A.14: McElmo B/w effigy vessel. Photograph by Bruce Bradley.

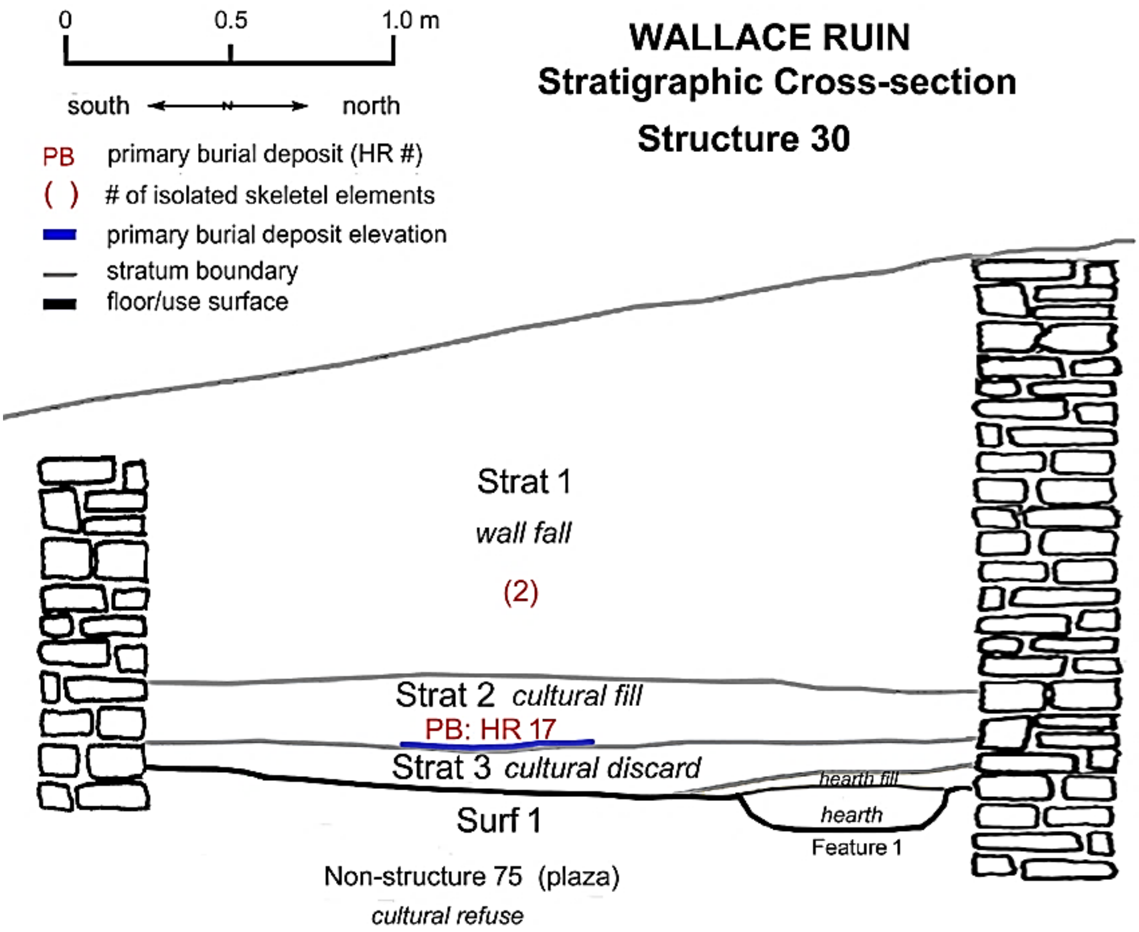


Fig. A.15: Stratigraphic profile of Structure 30 with summary data regarding locations of human remains.

Human skeletal remains

- Room 30a contains one primary burial deposit, no articulated anatomic units and two ISE.
- The adolescent female HR 17 is within a shallow depression that may have been cut into the upper contact zone of Strat 3. Although not directly associated with the effigy figure, this probable female was accompanied by a McElmo B/w ladle bowl and an olivella bead bracelet.
- HR 17 was not overlain by a concentration of cultural refuse.
- Articulating parietal and temporal fragments from an adult cranium (Link 1867) are in Strat 1 wall fall. Damage is consistent with dry-bone fracture.

Determination of chronological period for human remains

All human remains within STR 30 are allocated to the Pueblo III Period. Although not accompanied by a Mesa Verde B/w vessel, HR 17 overlies a stratum that Bradley (2010) deems post-AD 1180 based on ceramic seriation analysis. The two ISE are considered Pueblo III due to their position in the upper elevations of Strat 1. Although there is no toothmark or gnawing damage, the parsimonious explanation is that these fragments were moved to STR 30 by burrowing animals from a room containing primary burials disturbed by scavenging canids.

Table A.10: Chronological sequence of major events regarding Structure 30 (Phase 3a); those involving human remains are italicised.

PII	Construction of a one or two-storey structure near the north end of a 3-4 structure arm (Annex) appended to the SE corner of STR 27.
	Construction of Surf 1, a prepared floor, above constructional fill (Strat 4).
PIII	Accumulations of cultural deposits, possibly ritual discard (Strat 3) in 30a.
	Deposit of primary burial HR 17 on Strat 3 (contact zone), centre of Room 30a. Accompanied by one Mesa Verde Black-on white vessel.
	Accumulations of de-facto (complete, useable artefacts) deposits (Strat 2).
PIII +	Wall fall (Strat 1).
	Intrusion of 2 articulating cranial fragments into upper wall fall.

NORTH SUITE

The four structures that comprise the North Suite were produced by the internal partitioning of a large structure erected over foundation trenches, or footers (Bradley, 1988:13). As is the case for each Phase 3 structure, the Suite's two-storey walls are composed of compound masonry consisting of an outer and inner layer of overlapping sandstone slabs. The absence of hearths and the evidence of controlled access are consistent with a storage function. The presence of a "corn mother" in upper fill of STR 5 and stacked slabs on the floor of Room 6a may indicate that this use included storage of ritual paraphernalia. Whether these objects date to the Pueblo II or the Pueblo III Periods is unknown. On the other hand, artefact scarcity on floors or within floor fill of all four ground-storey rooms and those of Rooms 6b and 8b suggests that these chambers were rarely used in the Pueblo III Period.

Access into the North Suite was extremely controlled, with entry into Room 5a the most constrained. Whether roof hatchways were present is unknown, but the absence of external ground-storey doorways is certain. The east wall of Room 8b contains the only observed upper-storey doorway. The south wall of 6b is sufficiently preserved to ascertain that there was no 6b/7b raised-sill doorway, but whether Room 9b had a doorway in its east wall is unknown. The configuration of internal passageways between the upper-storey rooms is also unknown. As detailed in Figure A.15, the Room 8b floor hatchway provided access to 8a and thence to all ground-storey rooms. In contrast, the intact upper-storey floor of Room 6b has no hatchway; whether this applies to 9b is unknown. It is unclear if the remnants of a fallen wooden structure represent the roof or the upper-storey floor, but preservation is sufficient to determine that there is no hatchway in the southeast corner, as is typical at Wallace Ruin.

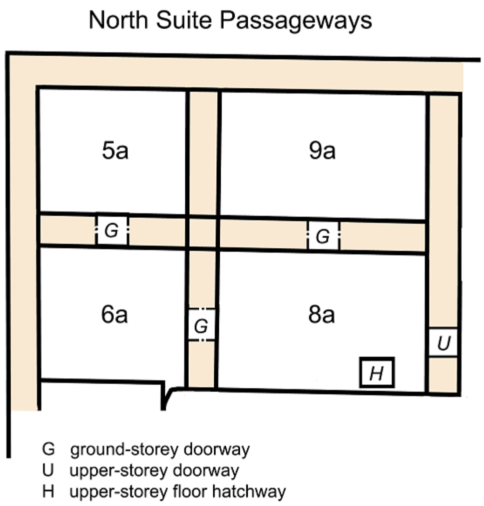


Fig. A.16: The locations of observed North Suite passageways.

STRUCTURE 5

Structure life history (Fig. A.17, A.18; Tab. 11)

- The only prepared floor in Room 5a dates to the Pueblo II Period.
- STR 5 contains no midden deposits.
- Strat 6 consists of a thin accumulation of floor fill composed of yellow silty-sand. It is the lowest stratum with Mesa Verde B/w sherds (10).
- The burning of organic materials in Strat 5 had scant effect on objects in Strat 6. Whether this was an intentional or natural event is unknown.
- The re-deposit of ISE on Strat 6 signifies the last indisputable use of 5a.

- There are no primary burial deposits in STR 5a, but there is one Individual Link, four articulated anatomic units, and 236 ISE (excluding 31 bones re-associated to iLink 326).
- 249 scattered and commingled bones are located on the upper contact zone of Strat 6, 15 are in the overlying burned organic layer (Strat 6) and 3 ISE are in Strat 1 wall fall.
- The “re-assembled” bones to iLink 326 are arranged in the southeast corner of the room. This highly unusual circumstance is addressed in greater detail in Section 8. . .
- At least one but perhaps three of the articulated anatomic units comprises bones to iLink 326. As detailed in Fig. 8.x, the four cervical vertebrae from Unit 254, adjacent to the “re-assembled” cluster, are almost certainly to this individual based on development, and gracility, and proximity; the vertebrae from Unit 1464 (8^{th} Thoracic-$3rd^{th}$ Lumbar) are probably to iLink 326 based on congruence in development, size and gracility. This anatomic unit is located about a meter away in the northwest quadrant of the room. It is less certain that the articulated foot (Unit 238) belongs to iLink 326. Vertebral unit 1486 is not to iLink 326 based on the duplication of elements and the presence of osteoarthritic lesions.

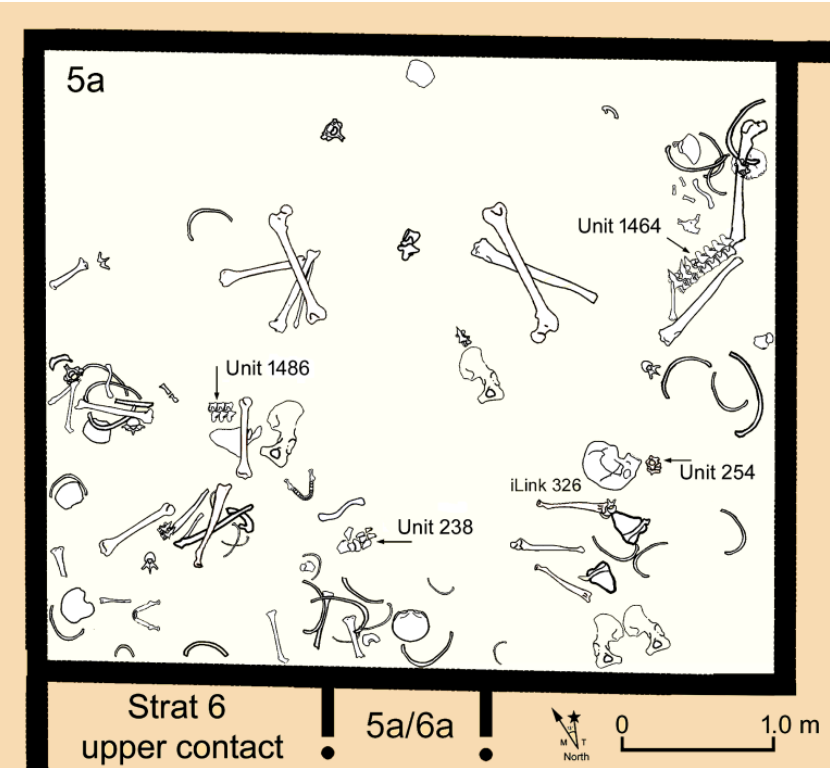


Fig. A.17: Locations of articulated anatomic units in relation to iLink 326 and a sample of ISE on the upper contact zone of Strat 6, Room 5a.

- Just one percent (3/267) of the bones in STR 5 exhibit heat damage. All three bones are ISE from Strat 6, and each has the brown-black colouration indicative of exposure to a low intensity fire. In addition, one of these bones (Ulna 5.24.296) exhibits canid damage (gnawing).
- ISE were apparently buffered by further accumulation of Strat 6 sandy fill prior to the burning of organic material in the overlying Strat 5.
- 11% (30/267) of the bones have peri-mortem damage from scavenging canids. These include the left femur, left os coxae and two lumbar vertebrae to iLink 326. No bones from Strata 1 or 4 have such damage.
- No bone in STR 5 has cut marks, scrapes, impact wounds or green bone breaks consistent with damage inflicted by humans.
- The positioning of a stone slab over the torso is a common Ancestral Pueblo mortuary practice.

Chronological determinations of human skeletal remains

AMS results for the “re-assembled” Link 326 indicates primary deposit in the early half of the AD 1200s of the Pueblo III Period. Accordingly, all ISE are allocated to that time frame based on stratigraphic evidence, the occurrence of Mesa Verde B/w sherds in Strat 6, and shared attributes with the Pueblo III bone taphonomy. The presence of articulated anatomic units from at least two individuals indicates that their cadavers were incompletely skeletonised at the time of the scavenging, which is consistent with the 1220s-1240s timespan. The dearth of heat-damaged ISE indicates that the deposit and burning of organic materials in Strat 5 was not associated with the re-deposit event.

Table A.11 Chronological sequence of major events regarding Structure 5 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey walls within NW corner of the North Suite; south wall shared with STR 6; east wall shared with STR 9.
	Construction of the original prepared floors (Surf 1, 5a; 5b, remnant wood structure either roof or upper-storey floor).
	Construction of raised-sill doorway in south wall (doorway 5a/6a); hatchway(s) existence indeterminate other than no hatchway in SE quadrant of (fallen) roof/upper-storey floor.
	Accumulation of yellow sandy floor fill on ground-storey Surf 1.
PIII	*Re-deposit of skeletised, canid-damaged ISE from primary burials originally deposited in other WR rooms; upon sandy floor fill (Strat 6) overlying the prepared ground-storey floor (Surf 1).*
	Further accumulations of sandy fill (Strat 6) cover the re-deposited ISE.
PIII +	*In situ* burning of organic materials (Strat 5).
	Development of strata involving structure collapse (1-3; roof/5b floor).
	Skeletised remains (ISE) moved across and between strata and possibly structures during animal burrowing; Strat 4 (15) and Strat 1 (3).

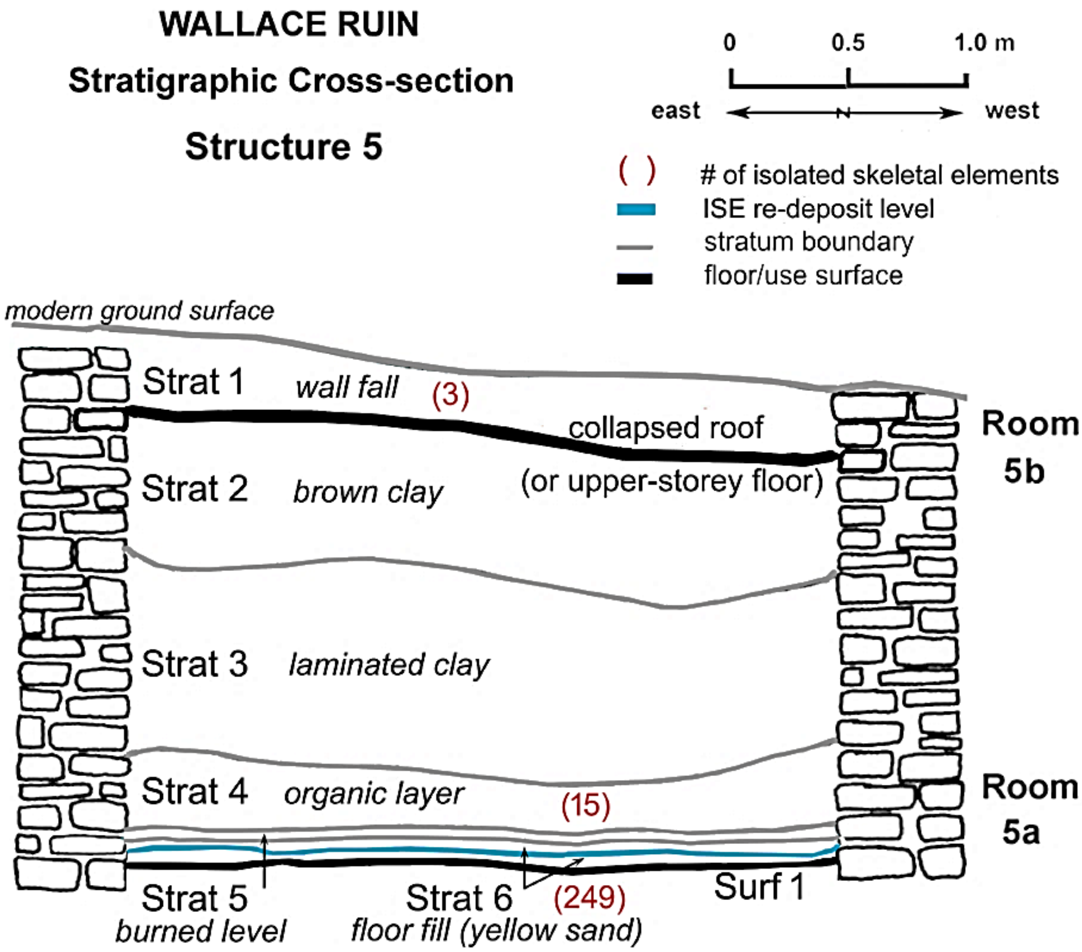


Fig. A.18: Stratigraphic profile of Structure 5 with summary data regarding locations of human remains.

STRUCTURE 6

Structure life history (Fig. A.19; Tab. 12)

- The only prepared floors in STR 6 date to the Pueblo II Period.
- Silty-sand floor fill (Strat 8) continued to accumulate and cover the ISE resting upon the floor fill (Strat 8) existent at deposition.
- Strata 6 and 7 are part of a deep, continuous mixed fill unit that is arbitrarily subdivided at the level of the 6a/8a doorway sill.
- Strata 6 and 7 contain sufficient quantities of cultural refuse to suggest that Room 6a was used intermittently as an intra-mural midden, though only after a thin layer of sandy fill covered ISE deposited upon the existent floor fill. Mesa Verde B/w sherds are common throughout.
- The size and intensity of burning within the area of the expedient hearth (Feature 1), at the level of the upper contact zone of Strat 6, suggests a single episode of use.
- The existence of underlying and overlying fill containing Mesa Verde B/w sherds indicates that this hearth was used at some point AD 1180-1280.

Human skeletal remains

- Structure 6 has no primary burials, individual links, or articulated anatomic units, but it contains the most ISE in the North Suite.
- The vast majority of the 476 ISE are small in dimension either due to element type (phalanges, etc.) or age of the individual. However, all age groups and both sexes are represented.
- 4% (19/476) of ISE have peri-mortem damage from scavenging canids, including bones from each stratum.
- 1% (7/476) of ISE have brown-black colouration consistent with exposure to low-intensity burning. Damage seemingly occurred after re-deposit; each of the long bone fragments, vertebrae or ribs is from the full-cut, wall support column and in the vicinity of the expedient hearth.
- No bone in STR 6 has cut marks, scrapes, impact wounds or green bone breaks consistent with damage inflicted by humans.
- The ISE in Strat 8 are just above the prepared floor at roughly the same elevation though not on an existing use-surface; the interpretation is that

they were deposited (in an open space) upon Surf 2 floor fill then eventually covered by a thin layer of floor fill originating from an ongoing, natural site formation process (Bradley, pers.comm (2015).

- The ISE on the depositional contact surface were not overlain by a concentration of cultural refuse.
- The ISE located under the full-cut support column (Segment 1) are on floor fill.
- Taphonomic consistencies and at least one credible pair-match indicates that ISE in Strata 6 and 7 originated in Strat 8 and were probably moved upwards during animal burrowing.
- Human intention is the only credible explanation for the location of Frontal fragment 6.62.14 of Link 145 on the re-deposit level. This takes into account that there are no doorways between Structures 6 and 7, the fallen 6b floor was intact at excavation and there was no 6b hatchway.
- Inter-mural Links: Cranial Link 145 (18a, 27a, STR 7); Sacrum 6.62.48 articulates well with iLink 326 Os Coxae 5.24.265 (Room 5a); 5th Lumbar vertebra 6.49.41 is very similar in size, development and gracility to the vertebrae of Anatomic Link 1464 of Room 5a/(probably iLink 326).

Determination of chronological period for human remains

All ISE are assigned to the Pueblo III subset of human remains. This finding is derived from stratigraphic evidence, the re-association of inter-mural links that are reliably dated as Pueblo III either from AMS results (iLink 326) or contexts that clearly are of Pueblo III origin (Cranial Link 145), as well as similarity to the Pueblo III taphonomic pattern.

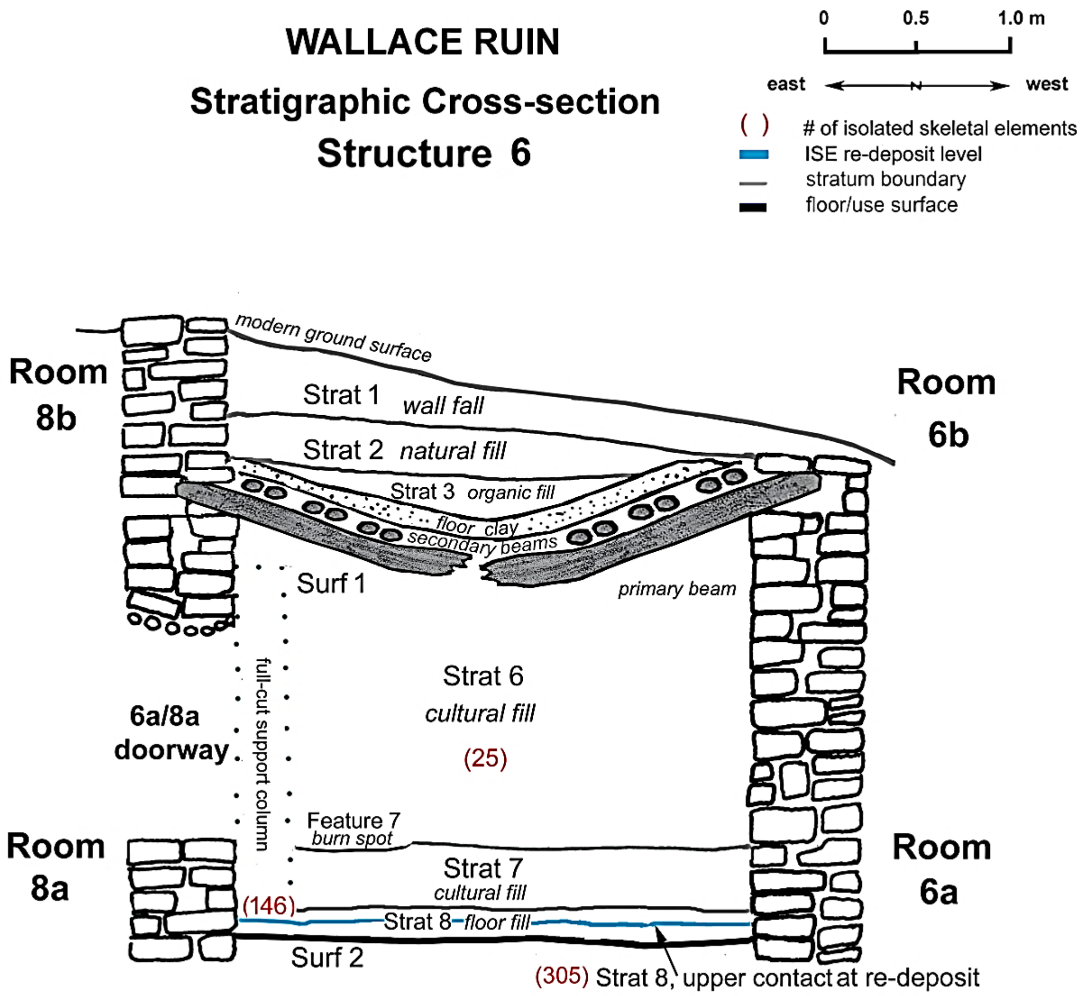


Fig. A.19: Stratigraphic profile of Structure 6, with summary data regarding locations of human remains.

Table A.12: Chronological sequence of major events regarding Structure 6 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey walls within SW corner of the North Suite; north wall shared with STR 5; east wall shared with STR 8; north of STR 7.
	Construction of the original prepared floors (Surf 1, 6b; Surf 2, 6a).
	Construction of a raised-sill doorway in the north wall (doorway 5a/6a); no Surf 1 hatchway; roof hatchway existence unknown.
	Accumulation of Strat 8 floor fill over Surf 2 of Room 6a.
PIII	*Deposit of 300-400 ISE on the upper contact zone of Strat 8 (floor fill).*
	Further accumulations of floor fill (Strat 8) cover ISE.
	Accumulations of mixed fill comprised of natural sediments and cultural refuse (Strat 7), including Mesa Verde B/w sherds.
	Creation of a single-use, expedient hearth in the upper contact zone of Strat 7, inside the 6a/8a doorway.
	Accumulations of mixed fill comprised of natural sediments and cultural refuse (Strat 6), including Mesa Verde B/w sherds.
PIII +	Structure collapse (Strata 1-5; Surf 1).

STRUCTURE 8

Structure life history (Fig. A.20, A.21, A.22; Tab. A.13)

- Surfs 1, 3 and 4 are Pueblo II floors.
- Stratum 7 of Room 8 is a thin accumulation of floor fill that developed during Pueblo II times; this unit pinches out a half-meter or so before each ground-storey doorway (west, 6a/8a; north, 8a/9a).
- The date of the flagstone floor (Surf 2) within the south-central region of Room 8a is unknown.
- It is unknown if flagstones originally covered the entire floor or if the ones near doorways 6a/8a and 8a/9a were subsequently removed.
- Structure 8 contains no midden deposits.
- Mesa Verde B/w bowl sherds are present on Surf 3 near the ISE in front of the west (6a/8a) doorway.
- The Surf 1 hatchway cover was in place at discovery (Fig. A.20).

Fig. A.20: Photograph upper-storey Room 8b, showing: the east doorway (only known exterior doorway of the North Suite); the prepared clay floor (Surf 1) overlying intact secondary beams; and the Surf 1 hatchway and its in-situ cover in the southeast corner of the room.

- •Structure 8 contains 44 isolated skeletal elements but no primary burial deposits (including Individual Links) or articulated anatomic units.
- •All age groups are represented.
- •The large majority (30) of the ISE are on Surf 3; the remainder are in Strat 7 (5), Strat 3 (6) and Strat 1 (3).
- •Some 15 commingled ISE from Surf 3 are adjacent to either the west 6a/8a doorway or the north 8a/9a doorway. The locations of the remaining Surf 3 bones (15) were not mapped; however, field records suggest that they were not within the area of the *in situ* flagstone floor.
- •The mapped (and photographed) ISE by doorway 6a/8a were not overlain by flagstones or a concentration of cultural refuse. Rather, they are overlain by materials from a collapsed section of Surf 1.
- •One or possibly two ISE (5%) have damage consistent with canid bites.
- •The likelihood is that the ISE in Strata 1, 3, and 7 were moved from Surf 3 during animal burrowing.
- •Inter-mural Links: Femur Link 3 (6a); Humerus Link 9 (6a); Scapula Link 1101 (9a); infant Cranial Link 157 (9a).

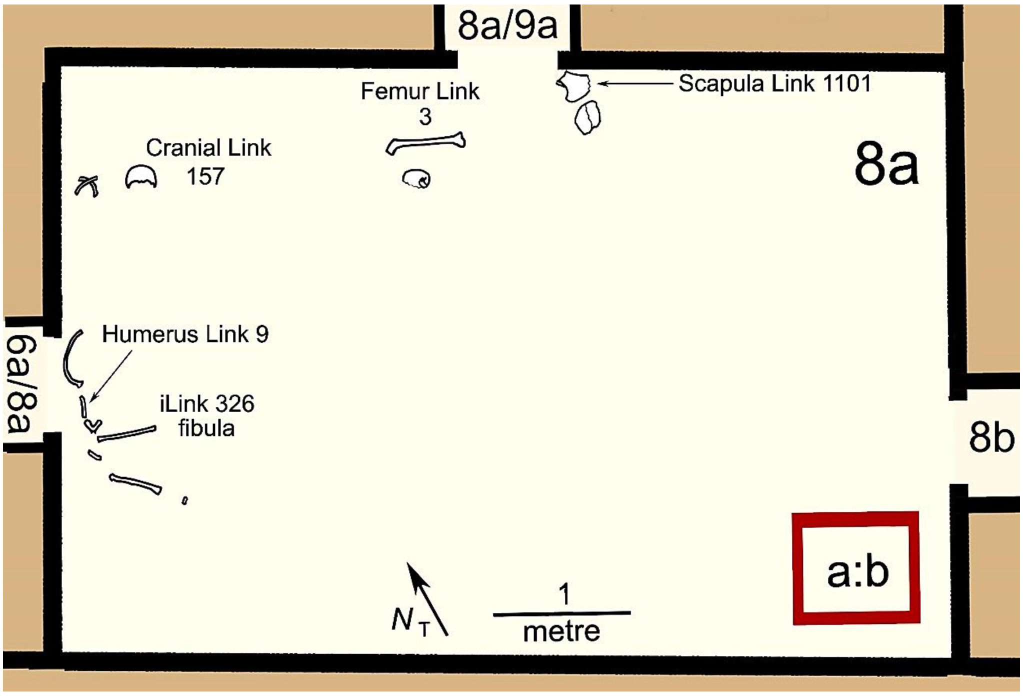


Fig. A.21: Plan of Room 8a showing the locations of selected disordered isolated skeletal elements and ISE, including four that belong to an inter-mural Link, including a fibula of Individual Link 326 (5a). The (covered) hatchway between Rooms 8a and 8b is in the SE corner.

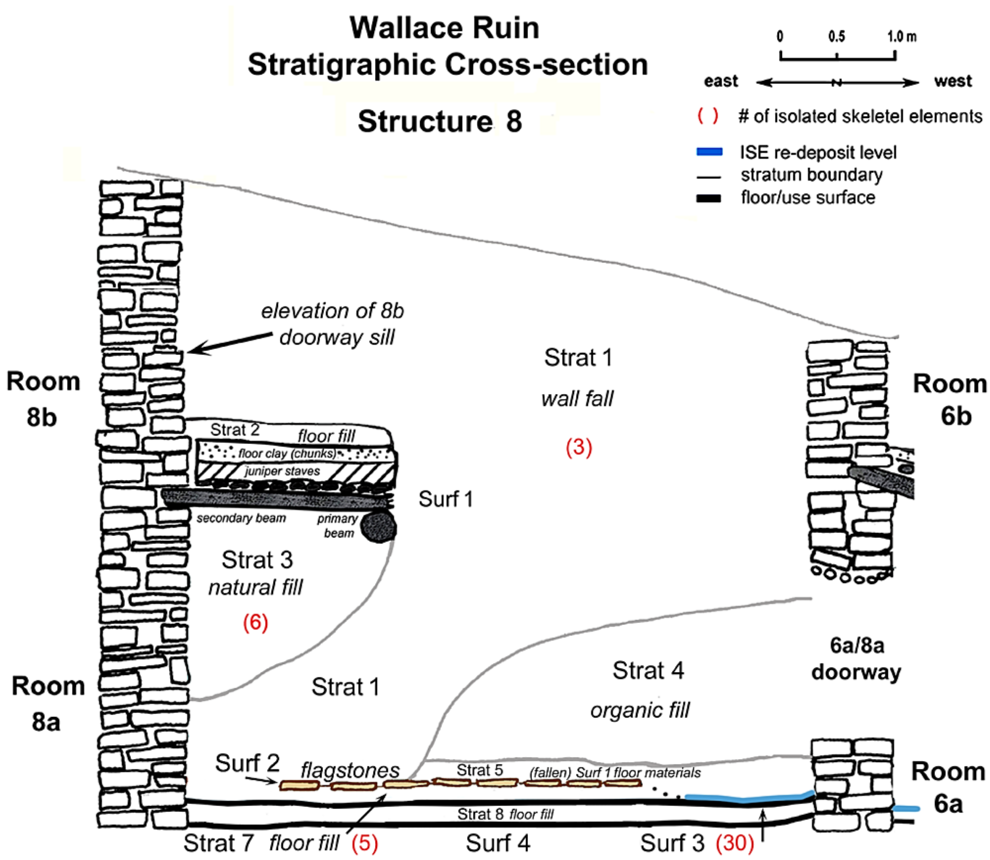


Fig. A.22: Stratigraphic profile of Structure 8, with summary data regarding locations of human remains.

Table A.13: Chronological sequence of major events regarding Structure 8 (Phase 3); those involving human remains are italicised.

Period	Event
PII	Construction of two-storey walls in the SE corner of the North Suite; north wall shared with STR 9; west wall shared with STR 6; north of STR 2; structure on east side is unexcavated.
	Construction of the original prepared floors (Surf 1, 8b; Surf 4, 8a).
	Construction of two raised-sill doorways: east wall of upper-storey Room 8b; 8a/9a; hatchway in SE corner of Surf 1; roof hatchway existence unknown.
	Prepared clay floor (Surf 3) constructed over floor fill (Strat 8) of Room 8a.
	Accumulation of floor fill (Strat 7); unit either does not extend or thins out in vicinity of ground-storey doorways.
PII-PIII	Flagstone floor constructed over Strat 7 in south-central 8a; only a few random slabs in front of doorways 6a/8a and 8a/9a at excavation.
PIII	*Re-deposit of commingled, canid-damaged ISE on Surf 3.* Surf 1 hatchway cover replaced.
PIII +	Structure collapse; however, southeast quadrant of Surf 1 remains intact and at original elevation, with hatchway cover still in place at discovery.
	Movement of ISE to Strata 1 (3), 3 (6) and 7 (5) during animal burrowing.

Determinations of chronological periods for human remains

All 44 ISE are allocated to the Pueblo III (P3WR) subset. This is based upon on the presence of large Mesa Verde B/w sherds on Surf 3, inter-mural pair-matches to bones from Pueblo III contexts, and, similarities to the Pueblo III taphonomic characteristics. The absence of Pueblo II primary deposits within the North Suite is another factor.

STRUCTURE 9

*Structure life history (*Fig. A.23, A.24; Tab. A.14)

- The only extant floor dates to the Pueblo II Period.
- Strat 8 comprises floor fill containing Pueblo II ceramics.
- STR 9 contains no midden deposits; all strata except Strat 8 contain materials associated with structure collapse.
- Room 9a contained scant fill prior to structure collapse.
- Most of STR 9 is filled with wall fall; the unit within Room 9b was slightly above the level of the intact wall at excavation.

Human skeletal remains

- Structure 9 contains one primary burial deposit, no articulated anatomic unit and 31 isolated skeletal elements.
- Primary burial HR 1 is located in the north-east corner of upper-storey 9b, near the upper contact zone of Strat 1 wall fall. This 1-2 year old infant was placed within an expedient cist formed from fallen wall stones. A thin layer of roughly piled stones covered the cist when discovered. There are no grave goods, nor sherds within the vicinity. The unfused but articulated cranial vault bones lack artificial deformation.
- All but one ISE were deposited upon the upper contact zone of Strat 8 (floor fill). An adult rib is in Strat 5 (soft fill).
- The ISE represent individuals from all age categories.
- 3% (1/31) of the ISE have damage consistent with canid scavenging.

•Almost half of the ISE (14/31) have stage 1 weathering or root damage; whether this is related to the original primary deposit environment or conditions involving Room 9a is unknown.

•The 15 mapped ISE constitute the larger or intact bones; small fragments were collected but not mapped.

•The location of the single ISE in Strat 5 is best explained by re-location from the Strat 8 upper-contact surface during animal burrowing.

•Inter-mural links: Scapula Link 1101 (8a); infant Cranial Link 157 (8a); Tibia Link 263 (5a)

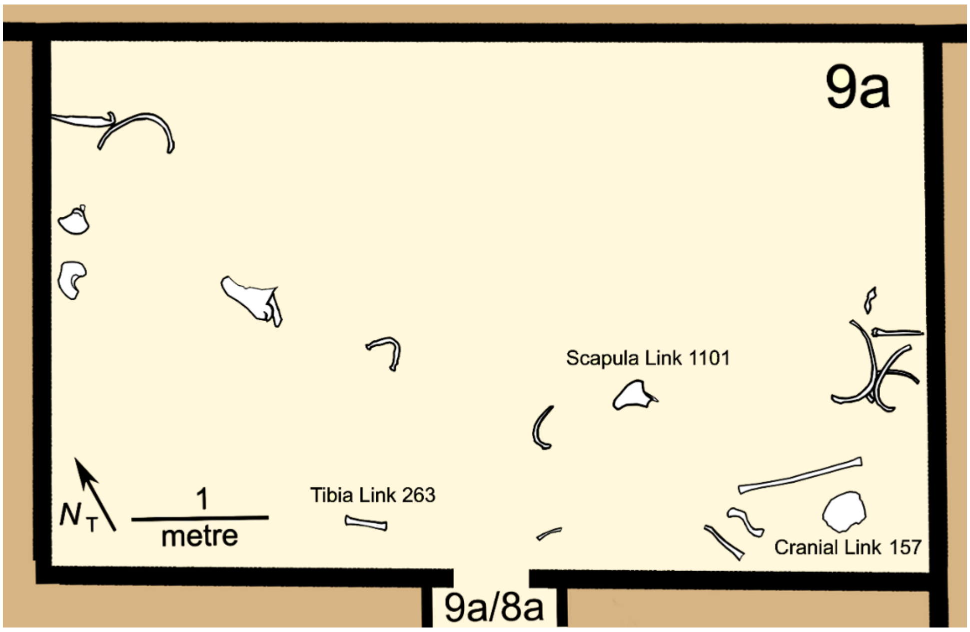


Fig. A.23: Plan of Room 9a showing the locations of selected disordered isolated skeletal elements and ISE, including three that belong to an inter-mural Link.

Determinations of chronological periods for human remains

All ISE are allocated to the Pueblo III Period based on pair-matches to bones interpreted as coming from a Pueblo III context. Taphonomic characteristics are also consistent with WR bones from that period as well. The determination of the timescale of deposit for HR 1 is uncertain. The location of the cist within and near the apex of the STR 9 wall fall deposits suggests a prolonged interval between this mortuary event and the re-deposit of ISE on Strat 8 in the AD 1200s. Although not necessarily conclusive, the absence of artificial cranial deformation may indicate that this infant is not Ancestral Puebloan but rather a member of a Numic group that occupied the Mesa Verde region after c. AD 1300. If so, the date of death could be any point up to the late 1800s or even early 1900s. The use of a cist for a Pueblo II or III mortuary location is also exceptional both at Wallace Ruin and within Montezuma County. The semi-flexed position of the infant and the use of a cist are not consistent with Euro-American "Christian" burial practices. For these reasons, HR 1 is classed as Indeterminate but possibly Prehistoric/Proto-historic.

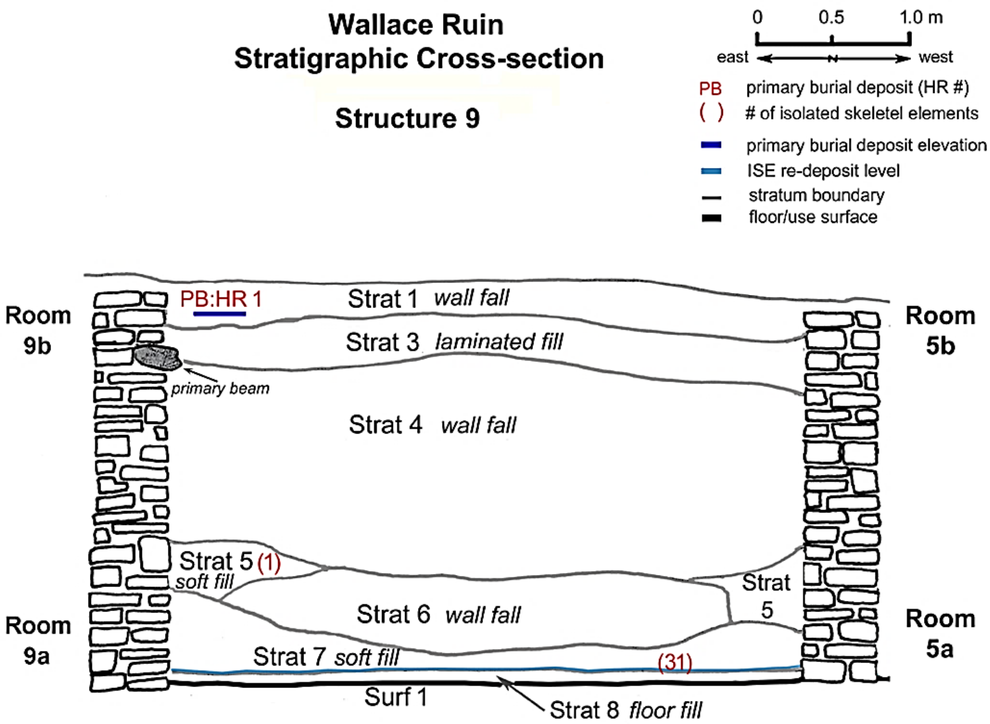


Fig. A.24: Stratigraphic profile of Structure 9, with summary data regarding locations of human remains.

Appendix B

Wallace Ruin Mortuary Biographies

Individual	Time Period
HR 1	Pueblo III-possibly Numic
HR 2	Pueblo III
HR 3	Pueblo III
HR 4	Pueblo III
HR 5	Pueblo III
HR 6	Pueblo III
HR 7	Pueblo II
HR 8	Pueblo II
HR 9	Pueblo II
HR 10	Pueblo III
HR 11	Pueblo III
HR 12	Pueblo II
HR 13	Pueblo III
HR 14	Pueblo III
HR 15	Pueblo II
HR 17	Pueblo III

HR 1

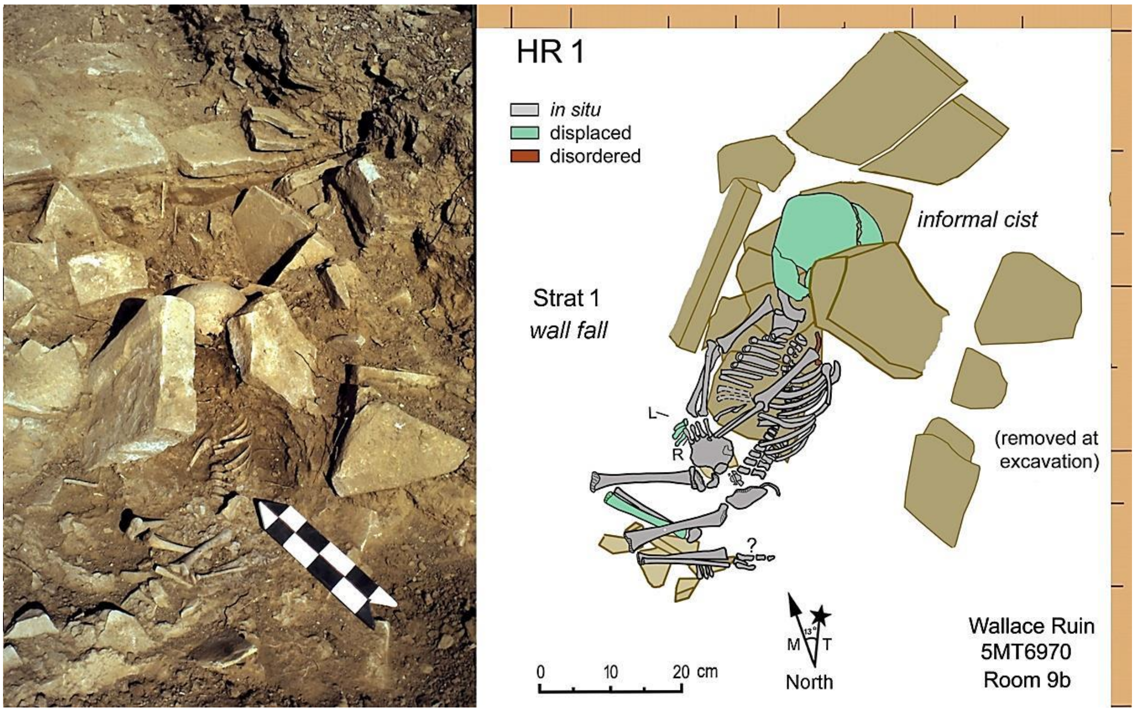


Fig. B.1:HR 1 mortuary context: field photograph, left; plan map, right

SUMMARY INFORMATION

***Human Bone Deposit**:* Primary Burial

***Age group/Estimated age**:* Infant; 3 y ± 12 m, dentition, skeletal development

***Sex**:* Unknown

***Location**:* North Suite, Room 9b; NE corner; at level of standing north wall, < 0.4 m below modern ground surface within Strat 1 wall fall (PD 73)

***Chronological Period**:* Late Pueblo III or Numic (?): c. late AD 1200s-1800s; after the re-deposit of disturbed and canid-damaged human bones onto the floor of Room 9a by Ancestral Puebloans; after the collapse of the STR 9 roof, Room 9b floor and the intermittent collapse of upper-storey wall stones into Room 9a and the lower half of Room 9b. Presumably, deposition occurred before the arrival of Euro-American settlers in the Lakeview Group vicinity.

Mortuary Context Type: Surface Room Fill; Other

Within a makeshift stone cist created for mortuary purposes. This feature was either inserted slightly into, or placed upon, a deep stratum of wall fall (natural fill) that had filled most of STR 9 prior to deposition. The deposit surface is uneven. The cist was fashioned from adjacent wall stones and then overlain by a small number of randomly placed stones.

***Accompaniments**:* None

Synopsis

Bones are primarily *in situ*. The skeleton is on the right side, with upper limbs in extension and lower limbs semi-flexed. The mandible presents the left anterior surface but the partly articulated, empty cranial vault is face-down.

Position relative to disposal surface

The anterior cranium is in direct contact with the disposal surface, as is the right upper limb, right scapula, right ilium, right femur and left lower limb. The right scapula and ilium present anteriorly. The left scapula and ilium touch the disposal surface but are verticalised. The unfused elements of the vertebral column rest upon an uneven disposal surface; they are in close anatomic position though within a sinuous alignment. The bones of the right lower limb present the medial surface; those of the left present the lateral surface. Such orientations are consistent with deposition on the right side.

Positions relative to other skeletal regions

The sternal end of the left clavicle projects superiorly; the orientation of the right clavicle is indeterminate from field records. The right ribs are flattened, but the sternal ends of left Ribs 1-8 project upwards.

The pronated and extended left arm and forearm project diagonally across the left hemi-thorax at an approximate 15° angle. The right humerus is adjacent to and parallels the right hemi-thorax. The right forearm projects medially and is flexed on the humerus at an approximate 40° angle. The left hand overlies the right in the region just superior to the right ilium. The thighs are loosely flexed on the abdomen but the legs are tightly flexed on the thighs. The knees point laterally and to the right (west). Several articulated bones from the left foot extend easterly along the same axis as that of the tibia.

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, the ordered arrangement of the skeleton (see figure above) and the associated architectural feature (cist).

Labile connections: right hand, Ray 3; left foot, Ray 1; cervical vertebrae

Persistent connections: Include: right humeral articulation (humerus-scapula); elbows, right femoral-acetabulum joint (unfused elements); left knee; thoracic and lumbar vertebrae

Evidence for material effect on anatomic position

The position of the mandible indicates that the head presented the anterio-left side at deposition. Eventually, the east and west wall slabs of the cist tilted inwardly as they settled, so that a corner of a large sandstone slab on its eastern wall came into direct contact with the posterior left parietal and occipital. Although these bones are undamaged, the weight of this heavy stone shifted the cranium, but not the mandible, into its current face-down position. The sinuous configuration of the vertebral column is attributed to the uneven deposition surface. The use of shrouding is indeterminate from clavicle orientation; the angle of the left clavicle is suggestive of disturbance by roots or small burrowing animals. The upward projection of several right ribs is associated with corpse positioning rather than necessarily indicative of wrappings. The 180° alignment of the left forefront is not anatomically possible in a living person; this may represent the use of wrappings that forced the foot into its current position (but see below).

Evidence for deposition in a void

- The collapse of the right temporal into the empty cranial vault cavity.
- Joint-space displacements: right tibia and fibula (fibula is in anatomic position in relation to tibia); left metacarpals. The 180° alignment of the left forefoot in relation to the tibia may indicate that this unit was displaced during decomposition or that it is in the original location but the leg bones have shifted position.

INTERPRETATION

Corpse deposition occurred in a small, confined but open space formed by a rudimentary sandstone cist in which most anatomic connections were maintained. Slight downward movement of bones during decomposition is attributed to gravitational forces on bones deposited upon an uneven surface; rodent burrowing or root invasion are also probably contributory. The use of corpse wrappings is indeterminate.

HR 2

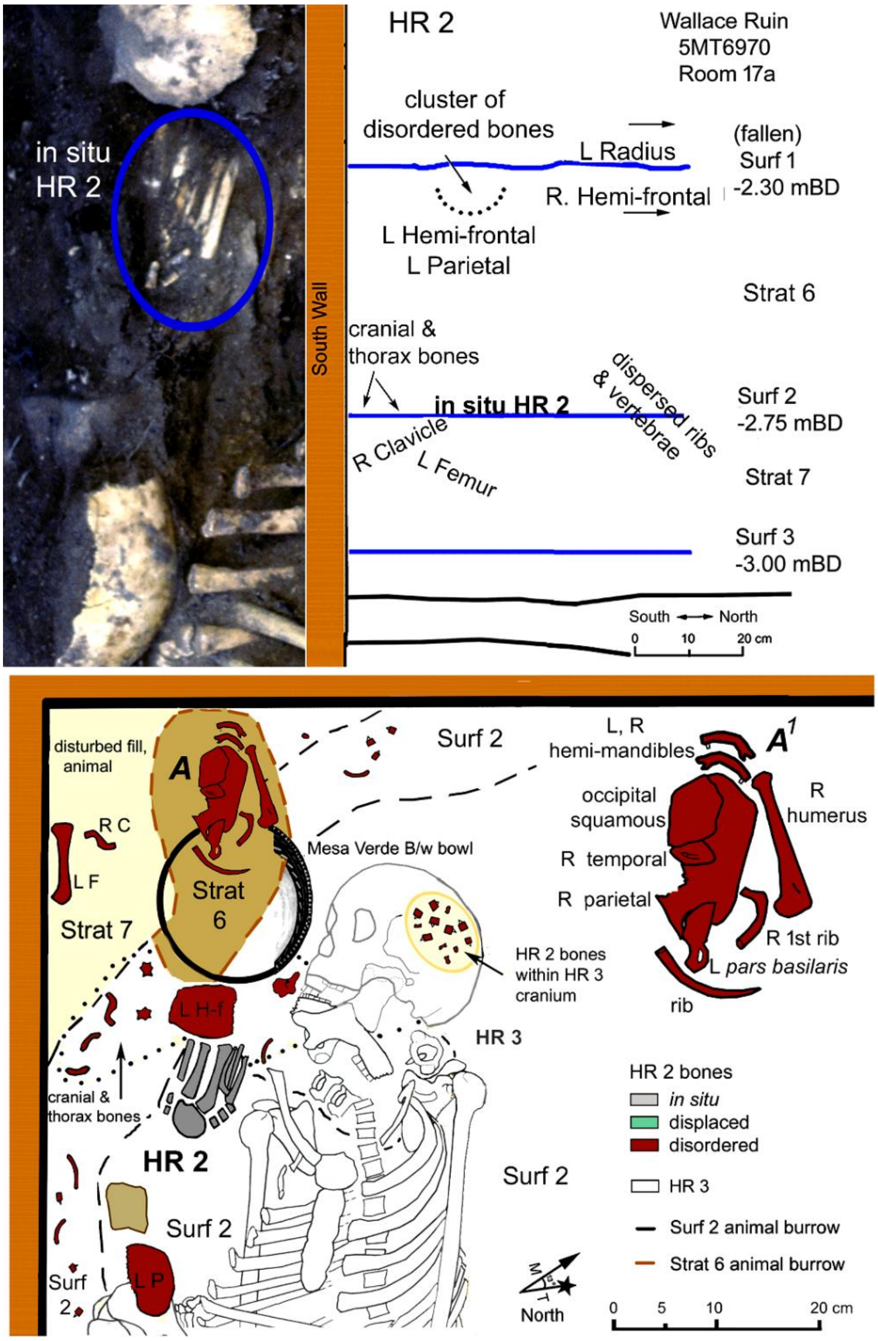


Fig. B.2: HR 2 mortuary context documentation: field photograph, top left; stratigraphic profile, top right; plan, bottom

SUMMARY INFORMATION

Human Bone Deposit*:* Primary Burial; Possible Double-Burial
Age: Infant; 9 m ± 3 m, dentition; 9-12 m, skeletal development

Sex*:* Unknown

Location*:* West Arm; Room 17a, near SW corner, Surf 2; between the south wall and HR 3; adjacent to the right shoulder of HR 3 and same elevation as HR 3.

***Chronological Period**:* Pueblo III: c. AD 1180-1220s (on same surface as HR 3, dated by AMS)

***Mortuary Context Type**:* Surface Room Floor

***Accompaniments**:* Unknown; nearby Mesa Verde Black-on-white bowl could have been placed with HR 2, HR 3 or both individuals assuming a double-burial

ANTHROPOLOGIE DE TERRAIN

Summary

The *in situ* bones comprise a few torso and hand elements and several long bones. The skeleton is on the right side and in a tightly-flexed position. Burrowing animals disordered the remaining bones; some are nearby but most are located along the south and west walls at the level of HR 2 and also into the overlying (Strat 6) and underlying (Strat 7) strata. Among these are several vertebral elements within the cranium of the adjacent HR 3; the empty cranial vault was accessed through the foramen magnum, apparently by nesting mice. All paired *in situ* bones are from the right side, with the exception of the left tibia and fibula and the left 12th rib. The disparity in paired bone representation may be the product of movement of the overlying bones from the left side of the skeleton during animal burrowing. The movement and commingling of elements from all regions of the body is consistent with disturbance following late Stage 4 or Stage 5 decomposition, as described in Işcan and Steyn (2013).

Position of skeleton relative to disposal surface

All *in situ* bones are in direct contact with the disposal surface.

Positions of elements relative to other skeletal regions

The right forearm and hand are, or would have been, tightly flexed on the arm (humerus, re-associated). The right thigh is tightly flexed on the abdomen and both legs are, or would have been, tightly flexed on the thigh (left femur, re-associated).

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of persistent anatomic connections, and the ordered arrangement of the *in situ* elements. The determination of *in situ* skeletal relationships is founded on the appearance of these bones as a unit; rotation along a long bone axis by one or more of these elements cannot be ascertained retrospectively.

Labile connections: few but sufficient to indicate deposit as a primary burial. The right Ray 1 metacarpal and proximal hand phalanx are in anatomic position. Although the evidence is less certain, the right Ray 1 distal foot phalanx is in a location and orientation suggestive of anatomic position (in relation to other *in situ* foot bones), even though the proximal phalanx and metatarsal are missing. The right femur is in close anatomic position to the ilium, but the tripartite acetabulum joint is too undeveloped for a credible assessment of this labile connection.

Persistent connections can be difficult to evaluate in young infants due to their skeletal immaturity. However, the right pubis and ischium are in anatomic position in respect to each other and the right ilium. The joint space of the right knee is probably within normal limits. The hyperflexure of the right thigh and leg is not natural in an older individual, but it may be possible in a young infants due to their greater flexibility and undeveloped muscle mass. Center for Disease Control and Prevention data provide information on normal anatomic range of motion for children older than two years (Soucie et al., 2010). It is not possible to evaluate rotation of a long bone axis using retrospective analysis. However, other indicators of *in situ* decomposition are provided by unfused epiphyses, which are classed here as a persistent connection. The right femur head is articulated with the diaphysis. The left tibia diaphysis is re-associated, but its undisturbed proximal and distal epiphyses are apparently in their original deposit locations; their orientations were not recorded in the field.

Evidence for Deposition as a Double-Burial

HR 2 is on the same surface (Surf 2) as HR 3, perhaps nestled near HR 3's right shoulder. Since the *in situ* remains of these individuals are not intertwined, is impossible to determine whether their mortuary context involves a double-burial or subsequent depositions over a relatively short time span. Other possibilities are that HR 2 was deposited either before or after HR 3. The absence of fill accumulations under each skeleton suggests that their dates of deposition were close in time even if not concurrent.

Evidence for material effect on anatomic position

There is no direct evidence for material effects on anatomic position. However, the extreme flexure of the upper and lower limbs indicates that the corpse was tightly bound at deposit with cloth or leather bindings. Shrouding is a distinct possibility given the use of these materials in other Wallace Ruin primary burials, but whether such swaddling alone would have been sufficient to create or maintain the tightly flexed body position throughout decomposition is questionable. Another possibility is that the small corpse was placed within a basket or woven mat, as observed at Aztec Ruin (Morris, 1924). Assuming so, such a container would have decomposed prior to disturbance and dispersal of the skeletonised remains. Tight flexing of the limbs is inconsistent with deposit within a cradleboard, versus evidence for such at Aztec Ruin but could have been in a woven mat of some type, as at Aztec Ruin (Morris, 1924).

Evidence for deposition in a void

Skeletal data are uninformative regarding deposition in a void versus a filled space. However, both stratigraphic and material culture evidence are compelling regarding the absence of intentional covering of the corpse with sediments or cultural refuse. The location of this infant on the same surface as HR 3, whose remains provide skeletal evidence of decomposition in a void, is suggestive that HR 2 was also deposited in an open space.

INTERPRETATION

Corpse decomposition of an infant primary burial deposit took place on the upper Pueblo III floor (use surface, Surf 2). Assessment of the HR 2's local mortuary environment of HR 2 is problematic since potential revolving of a long bone along its axis was not observed or noted in field records. However, the parsimonious explanation is that this individual was deposited in an open space, in line with the skeletal displacements observed in HR 3 and HR 4, also situated on Surf 2, as well as archaeological evidence. Possibly, HR 2 and HR 3 represent a double-burial. However, sequential deposit within a comparatively short period of time is just as likely, especially given that the abundant evidence that Room 17a was repeatedly used for mortuary deposit in an open space. In such case, it would have been a straightforward matter to deposit HR 2 prior to HR 3, or the infant could have been nestled between HR 3 and the south wall after the deposit of HR 3. The degree of flexure observed in the *in situ* bones suggests that the corpse was constrained in a tightly-flexed configuration by organic materials at deposit.

HR 3

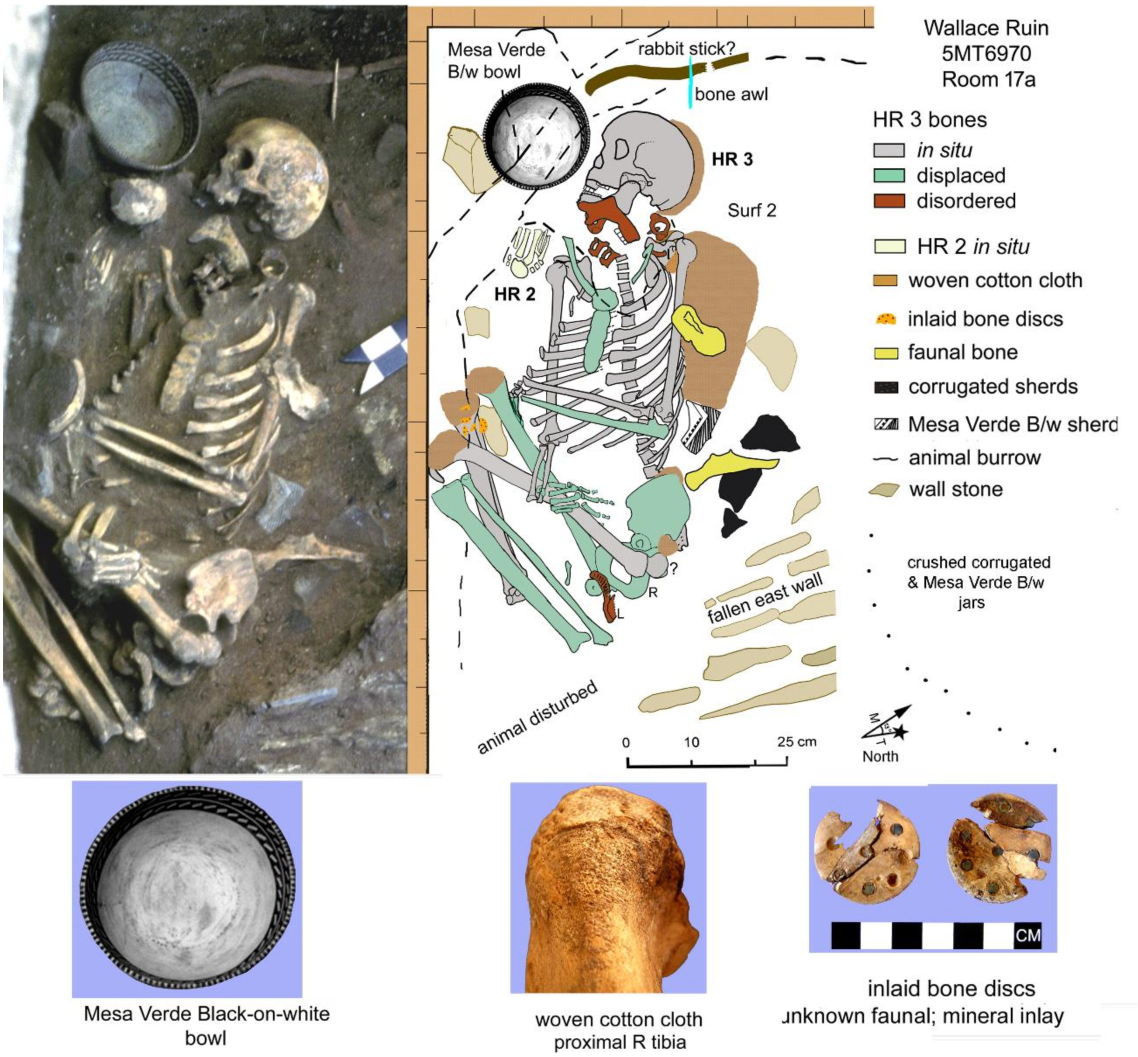


Fig. B.3: HR 3 mortuary context documentation: field photograph, left; plan map, centre; accompaniments, right (view possible rabbit stick in field photograph)

SUMMARY INFORMATION

***Human Bone Deposit**:* Primary Burial; possible double-burial

***Age Group/Estimated Age**:* Adolescent (older)*;* 15 y ± 36 m, dentition; 15-18 y, skeletal development

***Sex**:* male
***Location**:* West Arm; Room 17a, near SW corner, Surf 2; just north of the *in situ* bones of HR 2 and same elevation as HR 2.

Mortuary Context Type: Surface Room Floor

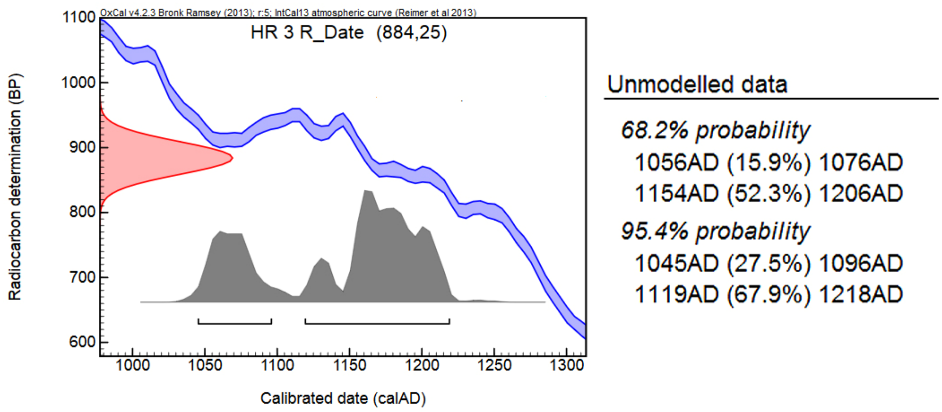


Fig. B.4: Uncalibrated AMS results for HR 3 (Oxcal 4.1).

***Chronological Period**:* Pueblo III; Mesa Verde B/w c. AD 1180-1280; pooled ceramic AMS probabilities: 68.2%, AD 1180-1206; 95.4%, AD 1180-1218

Accompaniments of certain association

Mesa Verde Black-on-white bowl; cotton shrouding remnants; two (fragmentary) inlaid faunal bone discs inset with mineral crystals (formal analysis pending); possible rabbit stick (not collected; disintegrated in field).

Shrouding: unburned woven cotton cloth remnants or impressions, still observable in fine silty fill at excavation, are located below and above numerous skeletal elements and regions; cloth remnant on right tibia preserved in field by spray application of diluted white glue; all other locations mapped but not salvaged. Evidence of cloth above and below the skeleton indicates that the entire corpse was wrapped at deposit.

Locations (see plan map above): beneath the right-posterior cranium; beneath the left humerus and scapula; posterior to the lumbar vertebrae, between the pelvic girdle and rib cage; inside the pelvic girdle in the region of the right sacro-iliac joint, 2-3 cm above the anterior (ventral) surfaces; bone and cloth are separated by soft fill; on distal condyles of the left femur; on the distal condyles of the right femur; and proximal end of right tibia (glued in place in field, using diluted Elmer's Glue mixture; woven cloth impression in very fine silt in within an irregular arc 10-15 cm to left of torso, extending from the cranium to the lower left ribs

Bone discs (17.121 and 122); formal analysis is pending: Unworked (?) faunal bone; species unknown other than large mammal. Cluster of fragments from two discs located just inferior to the right proximal tibia. Field Specimen records state:

“wrapped in cloth” [in reference to the cotton cloth remnants observable in the region of the knees] but no such materials survived discovery. Possibly, this observation refers to cloth impressions in silty fill. The presence of multiple small, refitting fragments in the region of the knees indicates that they were enfolded or attached to cotton cloth in this vicinity rather than moved to this location during burrowing by animals. Damage precludes determination of use as pendants. However, this location suggests incorporation in the shroud rather than personal adornment of the corpse.

Artefacts of uncertain association

Bone awl (17.132), large Mesa Verde B/w sherd, several corrugated body sherds; avian keel (breast bone) 17.198 and large mammal os coxae 17.198.

Field records indicate uncertainty regarding the association of awl 17.132, which is at a slightly higher elevation than HR 3. The whiteware sherd may belong to a large olla located near the centre of Room 17a; this unreconstructed vessel was smashed when the east wall collapsed onto Surf 2. The same situation may explain the presence of the grayware sherds. A thin layer of sediment separates the avian keel from the anterior surface of the left humerus. Artefact evidence from the vicinity just north of HR 3 thus suggests that these artefacts, and perhaps the faunal os coxae, may have been located elsewhere on Surf 2, or some perhaps in Room 15b, but were subsequently catapulted onto or near HR 3 when the east wall collapsed as a unit. Although these materials may not be associated with the deposition of HR 3, it is possible that they represent commemoration activities. Or, the discovered locations of some of these may be attributable to re-locations by burrowing animals.

ANTHROPOLOGIE DE TERRAIN

Synopsis

This adolescent skeleton is well-represented, and bones are primarily *in situ*. The superior skeleton is on the back (supine) though angled slightly to the right; it rests upon an uneven disposal surface that tilts slightly towards the south wall. The cranium rests directly upon the disposal surface; it presents the anterio-left surface. Animal burrowing within the region of the neck (C1-C5) and superior thorax prevents determination of the initial configuration of the occipito-atlanto (occipital condyles-C1) articulation. The standard anatomic position of the right mandible half (fragment) in respect to TMJ suggests that the current orientation of the cranium is *in situ,* as opposed to presence within the neck region as occurs with a dropped mandible. The mandible was completely fractured at midline when in a dry state (possibly when the east wall collapsed). The inferior rotation of the left fragment is attributed to animal disturbance. The unfused proximal humeral epiphyses are articulated with their diaphyses, and each head is articulated with or in close anatomic position to the glenoid cavity of the scapula. The scapulae, the right os coxae and the sacrum are flat on the disposal surface. Both thighs are flexed on the torso; the knees point to the right. The right lower limb rests on or just above the disposal surface; the left lower limb overlies the right. The left distal femoral condyles and the patella are in contact with the south wall. Most of the foot bones were located in a nearby animal burrow. The right upper limb is in extension; the left upper limb is flexed on the abdomen. Neither hand is in a natural position. Nevertheless, numerous labile connections are preserved. However, displacements of several persistent joints indicate major shifts in position during decomposition within an open space.

Position of skeleton relative to disposal surface

The scapulae are flat upon the deposit surface, as are the sacrum and right os coxae. Both shoulders and the right elbow are in direct contact with the disposal surface. The undisturbed section of the vertebral column is in a natural anatomic alignment. These *in situ* vertebrae rest directly upon the disposal surface; those assessable in field photographs present the left anterolateral surface. All are either in articulation with or in close anatomic position to adjacent vertebrae. The upright position of several right ribs is consistent with direct contact between the dorsal surfaces of their rib ends and the disposal surface, but this possibility cannot be confirmed from field documentation. The right knee rests upon the disposal surface; the left limb rests upon the right.

Positions of elements relative to other skeletal regions

The left humerus presents the lateral surface; the elbow rests directly upon the inferior rib cage; the forearm is pronated and flexed across the abdomen at a near right angle (80°). The digits are overlain by the right femur. The non-anatomic position of the hand is described below.

The right upper limb is fully extended and lies snug against the right hemi-thorax; the arm and forearm present the anterior surface; the elbow region is overlain by upright ribs of the right hemi-thorax. The parallel right radius and ulna are in standard anatomic position (radius is lateral) though the wrist is elevated; the forearm tilts upwards at about a 60°-70° angle (field assessment), with the distal radius and ulna shafts in direct contact with the lateral surface of the flexed left femur mid-shaft (ie., no soil in between the right forearm and left thigh. The position of the hand is described below.

The right os coxae is completely flat upon the deposit surface and in close anatomic position to the horizontal sacrum; the right femur head is just inferior to the ischio-pubic ramus. The left os coxae's iliac blade is in a near-horizontal orientation. It sits slightly above the right os coxae and sacrum and is displaced superiorly some 2-3 cm in respect to the other hip bones; the left ischio-pubic ramus fragment (dry-bone fracture) is displaced inferiorly, possibly by burrowing animals. The left posterior iliac crest rests upon the deposit surface and the anterior blade is just slightly higher in elevation; a thin layer of sediment, which is overlain by a remnant of unburned cotton cloth, separates the ossa coxae.

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, the ordered arrangement of the skeleton and the presence of grave goods.

Labile connections include: complete *in situ* left hand; essentially complete hands (both displaced as units); several foot rays (determined through re-associations though specific side is unknown)

Persistent connections: Include: humerus-scapula articulations; right upper limb; right knee (including patella); C6-L5 are in close anatomic position (C1-C5, T1 are displaced by animal burrowing); L1-L5 are in articulation; L5 is articulated with the sacrum. The status of costo-vertebral articulations at excavation cannot be ascertained retrospectively.

Evidence for material effect on anatomic position

Shrouding: Skeletal evidence for the use of a shroud, possibly accompanied with bindings, includes verticalisation of the right clavicle (left is missing), angular displacements of each hand, and retention of the anatomic position of the left patella in respect to the femur. The clavicle displacement is readily observable in the figure above. The other two are described in more detail below.

- Both hands include numerous labile connections but are in orientations that are impossible in a living person or a fresh cadaver. Given the presence of many undisturbed labile connections, rodent disturbance of either hand is unlikely. Both hands may have been forced towards the upper limit of the natural range of motion if the corpse was tightly wrapped with shrouding, or if binding material covered this region of the body. Gravitational forces then produced the non-anatomic, extreme angulations during decomposition. This degree of angular displacement is not characteristic of rigor mortis (Knüsel 2012, pers. comm.). The range of movement required for the displacement of each anatomic unit also provides solid evidence for decomposition in an open space.

Left: The essentially *in situ* left hand lacks only two phalanges, though the Ray 1 proximal phalanx is re-associated. Most of the digits are overlain by the right knee. The carpals are in anatomic position within the hand and in relation to the ulna (and possibly the radius). The metacarpals and phalanges from three rays (2-4?) are in anatomic position relative to each other and in actual or close anatomic position relative to the carpals. The upper-most ray (4?) presents the medial surface, so that the palm is oriented medially relative to the torso in a "thumb down" position, slightly beyond 180° from the neutral position. These three rays project inferiorly on the forearm at a 90°-95° angle. Since the normal range of motion for a wrist in flexion is 60°-80° (Eaton,1997), the interpretation here is that this hyperflexion represents movement of this hand as a unit during decomposition in a void.

Right: The supine right upper limb is fully extended, with forearm bones in anatomic position relative to the humerus and each other. The distal forearm bones rest directly upon the mid-shaft of the left femur. Most of the labile joints of the hand are intact. The carpals and metacarpals of the right hand rest upon a thin layer of fine sediment fill that separates them from the underlying lateral surface of the left femur mid-shaft. The generally articulated phalanges are in extension and angled downwards towards the pelvic cavity at a steep (approx. 45°) angle. The short bones present the posterior surface (the Ray 1 thumb is lateral).

The palm-down (prone) hand is displaced downwards (at a lower elevation along the inclined femur) relative to the forearm and it is rotated superiomedially. The metacarpals are thus rotated approx. 180°) and oblique (radial abduction) angle relative to the forearm. Standard anatomic position of the supine hand would have entailed metacarpals palm-up (Ray 1 lateral), with fingers extended or curled. If this had been the case, then the wrist and hand bones would have slumped inferiorly to the left femur during decomposition. The evidence indicates rather that the fully flexed was in a vertical (metacarpals up) position at deposition, with extended digits probably pointing or at least tilted superiorly. After the deterioration of soft tissues connecting the hand and forearm, gravitational forces acted upon the hand so that the metacarpals and digits collapsed as a unit into the discovered location and orientation. Soil beneath the carpals and short bones, which is absent from the forearm-femur contact, indicates that this movement occurred after a thin layer of sediment covered the inferior corpse.

- The left patella is in anatomic position in respect to the femur, even though the tibia is displaced several cm inferiorly. The presence of a cotton cloth remnant observable on the distal femur suggests that the patella was held in place by shrouding during decomposition. It then became wedged in place once the knee collapsed against the south wall.

“Wall effect”: right hemi-thorax and the left hand. The sternal ends of several right middle-inferior ribs project vertically and laterally (beyond the volume of the cadaver), whereas the left ribs are flattened and oriented inferiorly. The positioning of the right upper limb tight against the thorax may have provided sufficient support beneath the ribs until the costo-vertebral joints were covered with soil and held in place. The lateral limit of the hyperflexed left hand follows the alignment of the upright sternal ends of the right inferior rib cage. Possibly, both anatomic units may have been constrained/supported by a single object. This could entail shrouding and binding within this region of the corpse, or perhaps an object immediately adjacent to each anatomic unit. The potential that organic materials associated with the adjacent HR 2 provided this barrier is another possibility; however, it could be argued that the location of the infant at the level of HR 3's right shoulder is too distant from the hand and upright ribs to have such effect.

Evidence for deposition in a void

Multiple skeletal displacements provide solid evidence of deposition in an open space, or void, due to the effect of gravitational forces during corpse decomposition. The more significant alterations that are not related to animal disturbance comprise:

Directional (lateral/inferior) displacements within the torso; excluding those involving a downward collapse into the empty thoracic cavity (i.e., left ribs)

- The unfused but articulated manubrium and corpus sterni are displaced inferiorly approx. 10 cm and also laterally to the right at a 40° angle; the proximal end is almost in line with vertebral column but the inferior end is roughly 2-3 cm to the right.
- The inferolateral displacement of the sternum is accompanied by significant verticalisation of the right clavicle. The clavicle's sternal end is articulated with the sternoclavicular joint of the manubrium and oriented 65° in relation to anatomic position, or 25° in relation to the torso.
- The left iliac blade presents the dorsal (posterior) surface. This presentation is inconsistent with deposit on the back (anterior/ventral surface) or the right (verticalised; upward projection of the iliac crest; see Duday, 2009; Fig. 61). It instead represents a downward collapse onto the flattened pelvic cavity (horizontal sacrum and right os coxae). Reduction of the persistent joints of the pelvic girdle during decomposition occurs later than those within the thoracic/abdominal region (Roksandic, 2001:102, citing Dirkmaat and Sienicki, 1995)
- The left femur head is not in articulation with the acetabulum. However, field photographs show that the left iliac blade is displaced 2-3 cm superiorly in relation to the right os coxae. Whether the femur head is in its *in situ* position is indeterminate, but any such displacement would be slight. It is unknown if the superior and downward displacement of the iliac

blade is associated with the impact that produced the complete fracture of the ischio-pubic ramus and blade or if it represents collapse during decomposition.

Displacements involving persistent joints of the limbs

- The proximal articular end of the left radius is in anatomic position relative to the humerus, whereas the proximal articular end of the left ulna (olecranon) is out of position. It is displaced inferiorly 5-6 cm so that it is no longer in contact with either the olecranon fossa or the radial tuberosity; also, the shaft is slightly rotated inferiorly in relation to the radius and the distal humerus.
- The distal forearm intrudes and then exits the right hemi-thorax via the empty spaces between the upright sternal ends of three right ribs, either ribs 6 through 8 or 7 through 9. The distal shafts are roughly 2-3 cm below the level of the rib ends; the proximal shafts rest directly upon (or just above) *in situ* thoracic vertebrae. The distal ends of the radius and ulna are roughly 5 cm apart and separated by the near-vertical sternal end of a rib.
- The right femur head is displaced inferiorly several cm to a point just below the lower margin of the ischio-pubic ramus.
- The left femur head is not in anatomic position relative to the os coxae, but see below.
- Approximately 5 cm of open joint space separates the left femur and the tibial plateau.
- The left fibula is rotated on its axis; the shaft presents the medial surface whereas the tibia and femur shafts present laterally.
- Possible dropped patella (right); in disturbed fill below the knee

Range of Motion

All measured lower limb angles are beyond normal Range of Motion (Fig. B.5)

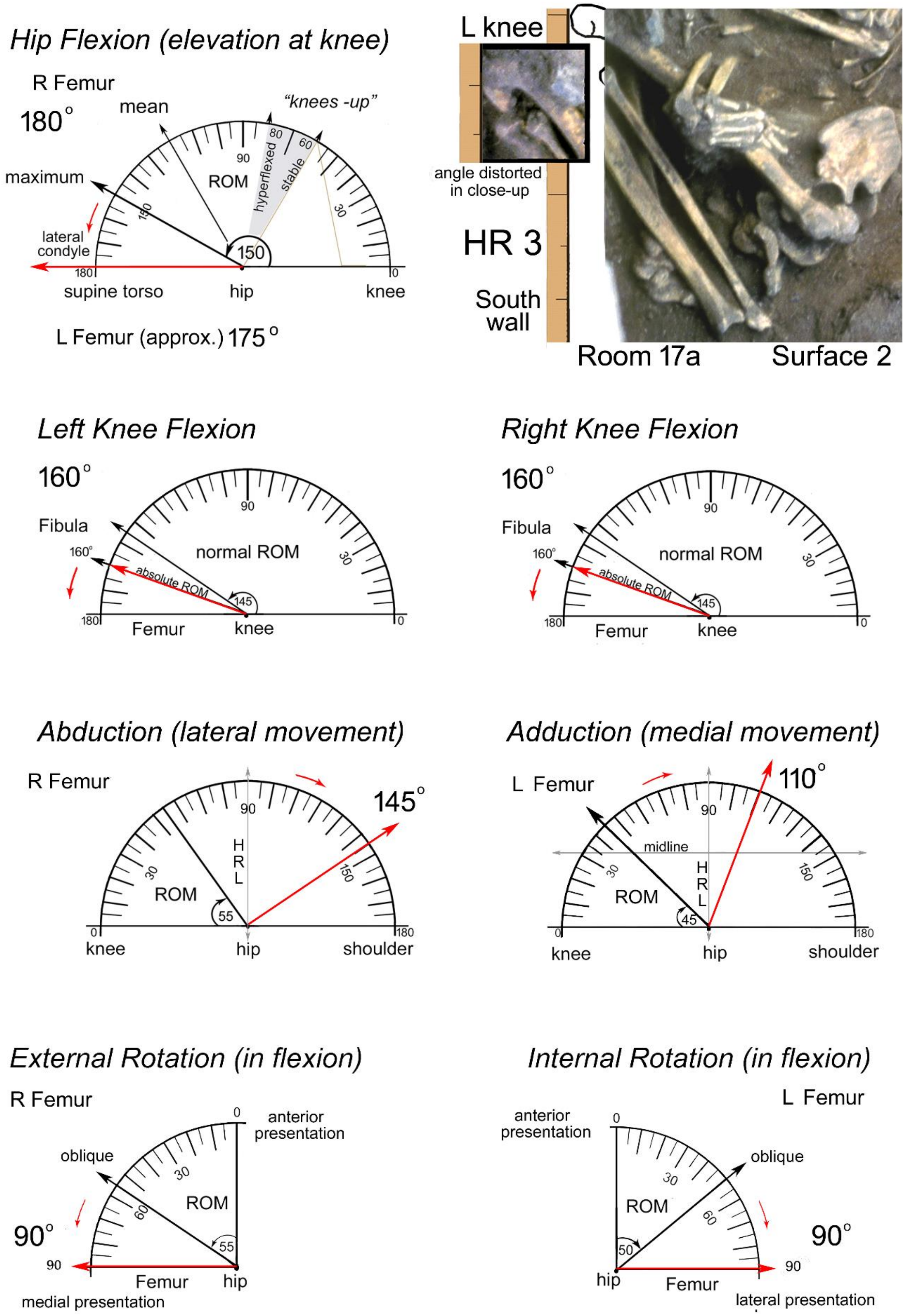


Fig. B.5: Range of Motion angles for HR 3.

INTERPRETATION

Multiple labile connections are indicative of a primary burial deposit. Cotton cloth remnants and impressions above, below and adjacent to the superior and inferior skeleton indicate that the individual was fully wrapped, or shrouded. The composed limb positioning, shrouding, and the presence of grave goods are consistent with mortuary behaviours.

Major skeletal displacements comprise persistent joints from multiple skeletal regions (left elbow, left knee, left fibula rotation, left os coxae), less persistent joints (right femur-os coxae), and the inferolateral movement of the sternum and right clavicle. Such large-scale movements could only have occurred during decomposition in an open space.

Of note, the intrusion of the forearm bones into the pre-existing thoracic cavity transpired only after decomposition of costal cartilage of the rib cage and that of the forearm muscles, tendons, and ligaments connecting the radius to the ulna. In addition, the location of the (rotated) right hand on soft fill, in contrast to bone-on-bone contact of the right inferior forearm on the left femur, indicates that initial decomposition of the soft tissues connecting the hand and forearm occurred when the hand was held in an open space, possibly by shrouding, before it revolved on its axis and completed decomposition upon the mid-shaft of the left femur.

The full contact of the scapulae, humeral heads, right elbow, right os coxae and sacrum on the deposit surface indicates deposit on the back with moderately flexed lower limbs pointed to the right. However, skeletal displacement evidence indicates that the knees were upright at deposit. The position of the distal end of the right forearm on the left femur mid-shaft is possible only if HR 3 was originally positioned on the back with thighs flexed at the observed angle. Yet, the near 90° angle of the left thigh on the torso is not possible if the corpse was on the back. This configuration is possible, in a fresh corpse, only if the individual was on the right side and then collapsed onto the back, or if on the back and then the lower limbs collapsed to the right. The first case is contra to the upper body joint evidence noted directly above. The latter is the more probable, especially in view of the pronounced inferior displacement of the right femur from the acetabulum, the inferior displacement of the right tibia, rotation of the right fibula, and the downward collapse of the left iliac blade. Although the original position of the right hand is indeterminate, it appears that the forearm came to rest upon the left femur after the collapse of the lower limbs.

Observed and inferred evidence of organic materials provides supplementary evidence for decomposition in an open space. Cloth impressions in fine silty sediment indicate the slow accumulation of dusty sediments over the corpse rather than covering of the cadaver with dirt during corpse disposal. There is no evidence of willow matting either under or over the corpse, even though un-burned cotton cloth has survived. Maintenance/slight expansion of the thoracic volume of the right hemi-thorax indicates the presence of an object exterior to the rib cage that supported the ribs in anatomic position until the accumulation of fill held the ribs, and probably the costo-vertebral articulations, in actual to close anatomic position. The slight tilt of the torso to the right, so that the right ribcage impinged on the right elbow region, may have been sufficient to maintain the *in vivo* rib position, but the extreme flexure of the left hand suggests that some other organic barrier was present as well. That cotton cloth overlies the sediments between the ossa coxae indicates that this remnant was associated with the left os coxae. Presumably, it became enfolded within the pelvic cavity during the collapse of the left os coxae onto the other hip bones.

Possibly, smashed pots between HR 3 and HR 4 could have been either grave goods or represent commemorative activities. However, there is no good evidence for intentional post-disposal interactions with the corpse itself given the anatomic integrity of most skeletal regions. The foot bones, in locations which could have been easily disturbed in such interactions, were significantly or completely disturbed by animal burrowing.

HR 4

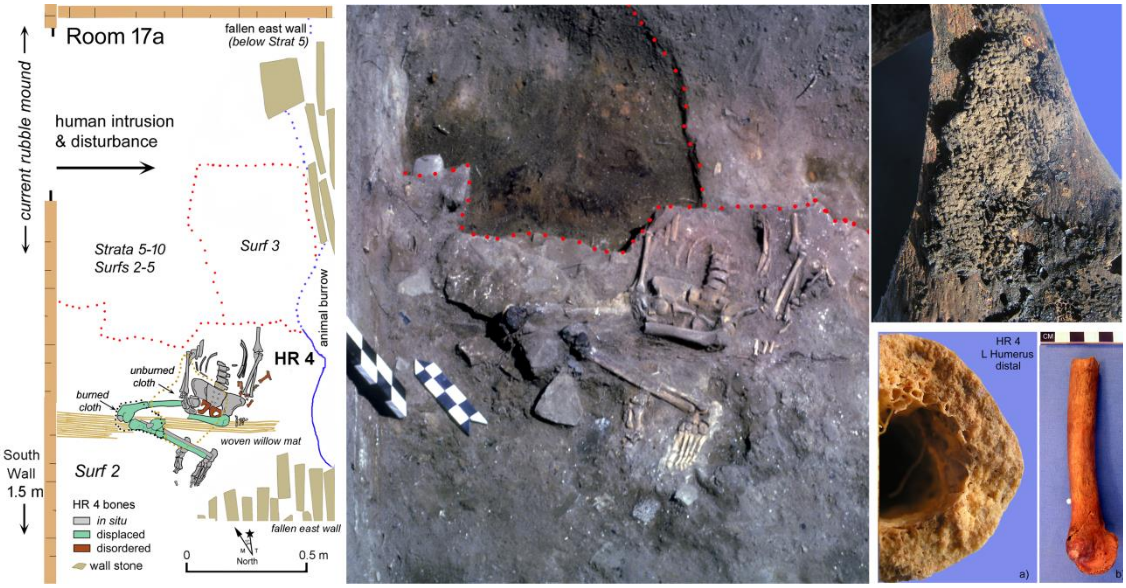


Fig. B.6: HR 4 mortuary context documentation: plan map, left; field photograph, centre; burned cloth on left femur, upper right; dry-bone fracture, humerus, lower right

SUMMARY INFORMATION

Human Bone Deposit*:* Primary Burial (intentional human disturbance)

Age*:* 35-44 y, pubic symphysis: 36.8y, SD 9.6, Suchey-Brooks Scores 4, 4; auricular surface: 35-44, Lovejoy, Scores 4, 5

Sex*:* male

Location*:* West Arm; central-west Room 17a, Surf 2; approx. 1 metre north of HR 3

Chronological Period*:* Pueblo III, AD 1180-1280; probably similar timeframe as HR 3 (pooled ceramic and AMS dates, AD 1180-1219) as on the same floor

Mortuary Context Type: Surface Room Floor

Accompaniments*:* woven cotton cloth (probable shrouding); woven willow mat

Unburned and charred woven cotton cloth impressions, stains and remnants are observable in the central-inferior regions of the semi-flexed *in situ* skeleton. The region of unburned cloth is documented but not preserved. Several sections of charred cloth adherent to the knee were recovered. The remnant on the right patella was stabilised with dilute Elmer’s glue in the field, but no preservative was applied to the remnant on the distal end of the right femur (see photo above).

Evidence of unburned, woven cotton cloth distributed upon or within the inferior regions of the skeleton:

upon and adjacent to the right forearm
beneath the 5th lumbar vertebrae
beneath the right os coxae, sacrum, and the medial left os coxae
upon the deposition surface between the right forearm and the pelvic girdle
upon the proximal half of the right femur
beneath the distal halves of the right tibia and fibula
beneath the proximal halves of the left tibia and fibula
beneath the proximal shaft of the left femur (excluding head & trochanters)
upon the deposition surfaces between the lower limbs

Evidence of charred, woven cotton cloth upon these skeletal regions:

anteromedial surface of the right distal femur
anterior surface of the right patella
anteromedial surface of the proximal right tibia
anteromedial surface of the distal left femur
lateral surface of the left condyle and the articular surfaces of the medial and lateral condyles of the left femur
anterior surface of the left patella
articular and lateral surfaces of the proximal left tibia

Poorly preserved remnants of a woven willow stick mat (1.2 sticks/cm) extend from a point just east of the pelvis to the west wall. It sits upon the disposal surface and is directly overlain by the pelvis and femora of HR 4. Its greyish-brown colouration is due to soil staining rather than heat exposure.

ANTHROPOLOGIE DE TERRAIN

Synopsis

The bones of the inferior skeleton of HR 4 are primarily *in situ.* This adult male was deposited upon his back, with prone (palm-down) upper limbs extended along the torso and flexed lower limbs in a knees-up position. The near complete absence of the superior skeleton is attributable primarily to a deliberate, human intrusion through the exterior west wall after complete skeletisation (dry bone, Stage 5). Stratigraphic evidence places this intrusion event within the prehistoric period. Animal burrowing disrupted anatomic connections in the left hand, and it also dispersed ribs and vertebrae into overlying strata. Four vertebrae within animal-disturbed strata in the adjacent Room 15b almost certainly belong to HR 4. The complete absence of displaced ribs and vertebrae within the thorax suggests that they were removed during the intentional post-depositional disturbance of HR 4, then subsequently to their discovered locations by burrowing animals. Nevertheless, numerous labile connections are preserved. However, the displacement of the lower limbs relative to the torso points to a major shift in position within an open space consequential to the collapse of the upper-storey floor onto the fully skeletised remains of HR 4.

Position of skeleton relative to disposal surface

Elbows (right forearm only), left wrist, lumbar vertebrae, sacrum, ossa coxae, femoral heads, and the plantar surface of the left foot lie flat upon the disposal surface. The right foot is in direct contact with the floor but presents anteromedially. The charred knees are elevated 2-4 cm above the floor; they rest directly upon a small pile of wall stones situated near the west wall. These stones sit upon the disposal surface, but whether they were present at deposition or are associated with the collapse of the upper-storey floor is unknown.

Positions of elements relative to other skeletal regions

The right hand rests upon the neck of the right femur (adjacent to a remnant of poorly preserved, unburned cotton cloth). The articulated phalanges follow the natural curve of a hand at rest. Animal burrowing disturbed the left hand significantly, but the positions of the left forearm bones are similar to those of the right. The mid-shafts of the left leg (tibia and fibula) overlie the left ankle. The left fibula is in anatomic position relative to the left tibia but not the left foot.

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, the ordered arrangement of the skeleton and the presence of grave associations (shrouding and willow mat)

Labile connections: left foot (complete), right hand

Persistent connections: Include: left elbow, proximal right forearm; right wrist; L2-L5; L5-sacrum; pelvic girdle

Evidence for material effect on anatomic position

The downward displacement of the lower limbs is associated with the collapse of the burning upper-storey floor (17b) onto the fully skeletonised (Stage 5) HR 4. The inferior skeleton took the brunt of the impact, though the left humerus has a complete transverse fracture at mid-shaft, and the distal end of the right radius has crushing damage. Both os coxae have a complete fracture of the ischio-pubic ramus. Five lower limb long bones incurred at least one complete transverse fracture (Fig. B.7) In addition to these, the right femur and tibia have numerous longitudinal fractures. The left fibula is intact apart from crushing damage at the proximal end. Most fractures are near mid-shaft, but complete breaks are also present at the distal end of each femur and the proximal end of the right tibia. These fractured areas correspond to locations of underlying stone slabs. All fracture attributes are consistent with dry-bone damage.

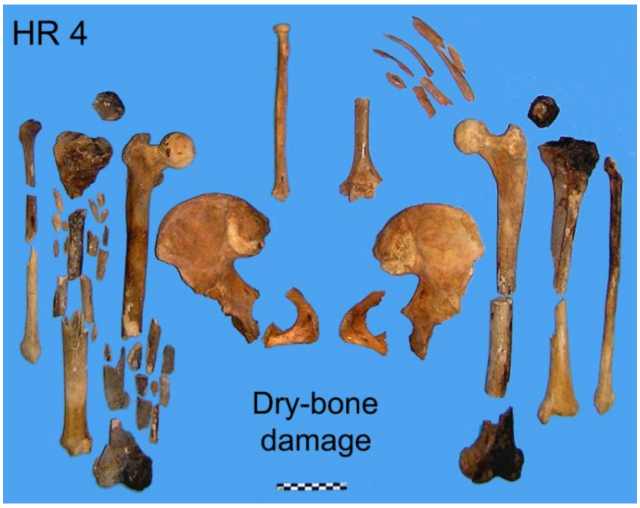


Fig. B.7: Burn and fracture patterns in HR 4 bones.

All six lower limb bones evidence direct exposure to a heat source, as evidenced by blackened and charred bone tissue (Dehaan, 2015). The knees are the most severely affected, whereas the hips and ankles show no evidence of heat exposure. Each knee region is charred or has black (or dark brown) colouration. In contrast, mid-shaft bone surfaces inferior and superior to these regions are light brown. Fragments of charred woven cotton cloth adhere to anterior bone surfaces within the knee regions, including the patellae. Charred cloth fragments also extend across the articular surfaces of the left distal femur and especially the left tibial plateau. The intrusion of cloth into and across this joint space could only occur after the loss of soft tissue. Most cloth fragments are black, with some areas grade into dark brown. A section of unburned cloth (not recovered) and cloth impressions in silty fill are located in skeletal regions having scant or no evidence of heat exposure (right radius, pelvis).

Exposure to flame will produce less destructive effects on dried versus green bone tissue (Asmussen, 2009; Dehaan, 2008; Gonçalves et al., 2011). Each affected bone has normal surface texture, with no cracking or peeling. No bone shaft is warped, nor are there curved transverse ("thumbnail") fractures; such attributes are uncommon in dried bone since the loss of bone collagen reduces elasticity (Goncalves et al., 2011:1312). Both cortical and cancellous tissues within the left femur's medial condyle are charred, though the conjoining segment from the lateral condyle is unburned though brown in colouration. Such colour variation in conjoining fragments can either represent differential exposure to a heat source (Asmussen, 2009:530) or it may indicate a burn line fracture (Symes et al., 2015:45-50) in enfleshed bone. However, there is no off-whiteish heat line or distortion of the outer layer of HR 4's femoral cortical bone. In this case, the jagged appearance of the fracture edges suggests dry-bone impact damage incurred when the distal femur collapsed onto underlying stones. The dry-bone fractures affecting unburned bones further signals that colour variation within long bone shafts is due to the incidental exposure of specific skeletal regions to fire (Asmussen, 2009) rather than tissue shielding in a corpse still retaining soft tissue (Symes et al., 2015:34).

In their analysis of patterned thermal destruction of human tissues, Symes and colleagues (2015) Figure 2.7 document the first areas to burn in an enfleshed body; among the skeletal regions so affected in this "pugilistic" pattern are the elbows, knees, extremities, ribs and hips (including the proximal femora). This graphic also denotes common zones of thermal fracture within the distal humerus, distal femur and distal tibia. The distribution within HR 4's skeletal remains is distinctly different: no elements other than those of the lower limbs evidence exposure to a heat source, including the pristine extremities. Also, though the distal femora are fractured, the distal tibia shafts are intact and the right humerus fracture is at mid-shaft.

The knees are approximately 10 cm apart. Archaeological evidence shows that neither the stones that underlie both knees nor the sediments near or between the knees exhibits evidence of exposure to a heat source. This is in marked contrast to the overlying burned sediments in Stratum 5. Significantly, the section of what would have been very flammable, dry willow matting underneath the knees is neither blackened nor charred.

Evidence for deposition in a void

Skeletal evidence

Pelvis:

The configuration of the pelvis demonstrates deposit on the back. The ossa coxae and sacrum lie flat upon the deposition surface and present the ventral surface. The iliac blades are in close anatomic position to the sacrum. Complete post-mortem fractures separate most of the ischio-pubic region of each os coxae from its iliac blade. Both arches present the dorsally rather than anteriorly, to the extent that the pubic symphyses are almost in contact. The ventral margin of each ischiopubic ramus rests upon the deposit surface.

Left lower limb:

The left femur is flexed on the torso at a near right angle and presents the lateral surface. It slightly overlaps the inferior margin of the left ischio-pubic ramus fragment. The femur head is displaced slightly from the acetabulum. Both ends of the superior fragment of the femur, which includes the intact head and about half of the shaft, rest upon the disposal surface (Surf 2). The conjoining mid-section fragment (not in the field photo above) was recovered from an animal burrow. The inferior fragment, comprising the condylar region, is on a stone slab and at an elevation just above Surface 2. The medial condyle is in direct contact with this slab.

The patella is in close or standard anatomic position. Black, charred woven cotton cloth covers the anterior surface. The presence of charred cloth on the contiguous long bones suggests that this bone was held in anatomic position by shrouding throughout skeletisation.

The left tibia is flexed on the femur at an estimated 40° angle and presents the lateral surface; the proximal end is just above Surface 2; the distal end rests upon Surface 2. The distal articular surface is adjacent to the talus but not in articulation.

The left fibula is in anatomic position and presents laterally. The damaged end is brown but not charred.

The left foot is intact, and all bones are in anatomic position. In contrast to the tibia, the foot presents anteriorly (plantar-surface down).

Right lower limb:

Due to post-mortem fracture of the right os coxae, the anatomic relationship between the acetabulum and the femur head is not confirmed absolutely. However, it is in very close anatomic position, at the least. The femur fragment comprising the head and superior two-thirds of the shaft are in direct contact with the deposit surface. The lower third of the shaft is at an elevation 4-5 cm above the disposal surface. This section consists of 10 or so fragments created by complete longitudinal fractures. This region of the femur shaft is in direct contact with the edge of a sandstone slab that sits upon the disposal surface. The distal condyle fragment is just above floor level, and it sits directly upon a thin wall stone. The patella is in close anatomic position.

The right tibia is in anatomic position. The proximal end is in direct contact with an underlying stone; the distal end rests upon (or just above) the disposal surface. The proximal half of the shaft is composed of numerous fragments having complete transverse or longitudinal fractures. The distal half of the tibia is overlain by the left tibia. The fully articulated right foot is in anatomic position. Photographs indicate that it presents antero-medially. According to field notes, the foot was "slightly on its right side." The precise anatomic relationship between the talus and the tibia was not recorded at excavation and cannot be ascertained from retrospective analysis. As documented in Figure B.7, all measured lower limb angles are beyond normal Range of Motion.

INTERPRETATION

The principal evidence for deposit in a void pertains to the significant change from a flexed, upright knees configuration at deposit to one in which the still-flexed lower limbs are on or just above the deposit surface. The positions of the elbows, left wrist, pelvis, and several *in situ* ribs are conclusive regarding deposit on the back.

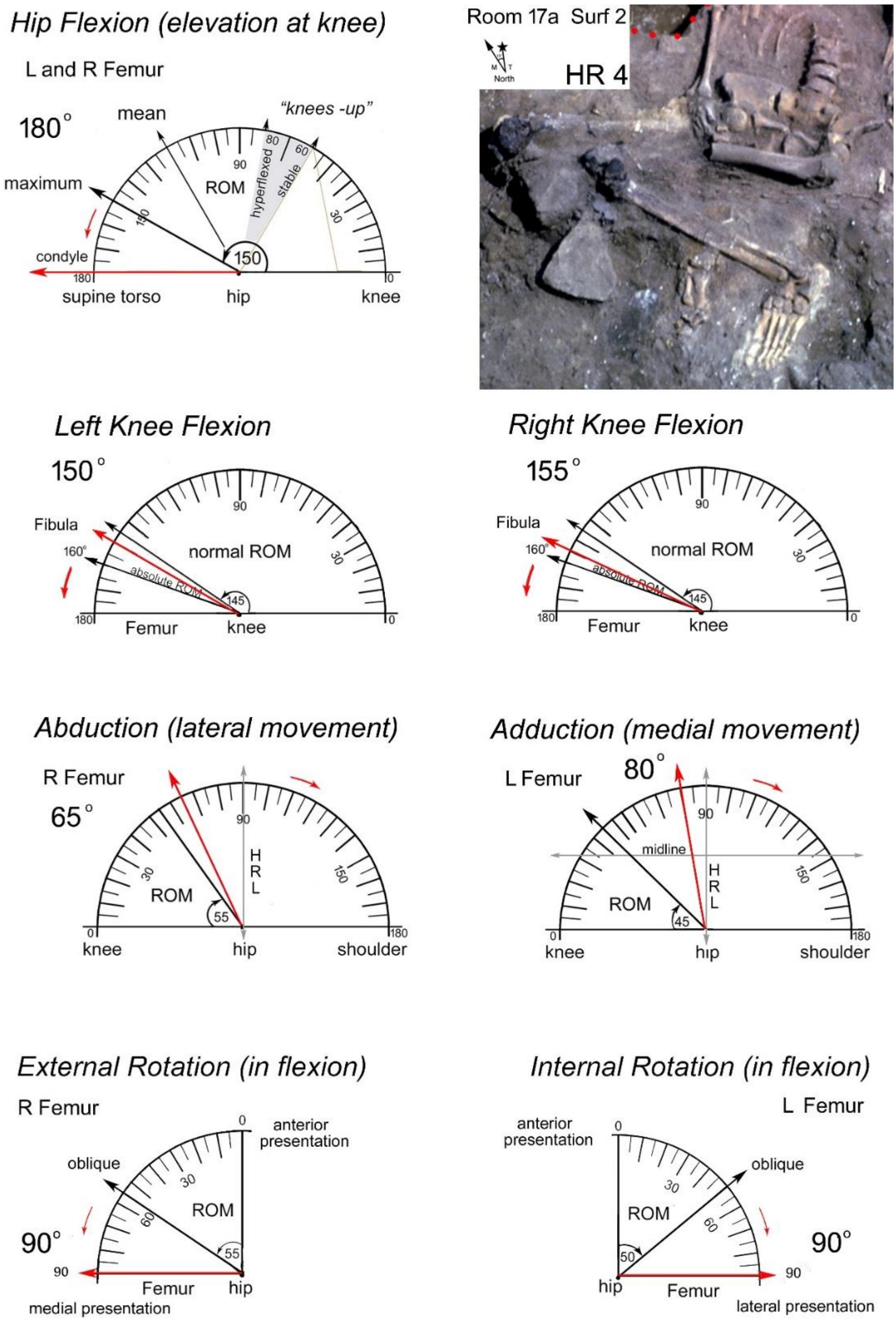


Fig. B.7: Range of Motion angles of HR 4.

The current locations of both ischio-pubic regions point to downward displacements into the empty pelvic cavity after their complete fracture from the iliac blades. The maintenance of all connections within the intact left foot means that this unit retained its original, plantar-side down position when the tibia shifted from an approximate right angle to a near 180° angle. The most telling evidence pertains to the current configuration of the lower limbs in relation to the torso. The elevations of the knees at discovery are not possible in a fresh corpse. The normal ROM involving a supine position with knee flexed, internal/external rotation of the hip and either abduction or adduction of the hip is approximately 45°. In contrast, both knees are on the same plane as the supine pelvis.

Taphonomic evidence indicates that all fractures and charring occurred when bones retained scant levels of bone collagen. The patterns of dry-bone damage are consistent with impact fractures incurred when the lower limbs were forced to the right and downwards onto stone slabs when the burning upper-storey floor collapsed. Bone taphonomy also indicates that both knees were elevated above the deposit surface when first exposed to fire. The pattern of burning damage is very similar in both knees, though the left is more severely affected. Compared to the unburned condition of all other *in situ* elements, large sections of shrouding and the underlying willow mat, this localised damage indicates that only these two skeletal areas were exposed directly to flames of sufficient intensity to char dry bone and cotton cloth. The restriction of charred organic material to anterior bone surfaces indicates that shrouding draped the knees while still adjacent to each other and in an upright position. Morphological characteristics of the knee joint also point to an upright, or open, configuration of the knee. The presence of adhering fragments on the medial articular surface of the tibia plateau is more suggestive of anterior-posterior versus latero-medial movement of cloth into this space. If an *in situ* lower limb presented laterally, the proximity of the lateral condyle of a femur to the tibial plateau would block intrusion of clot within this joint space.

HR 5

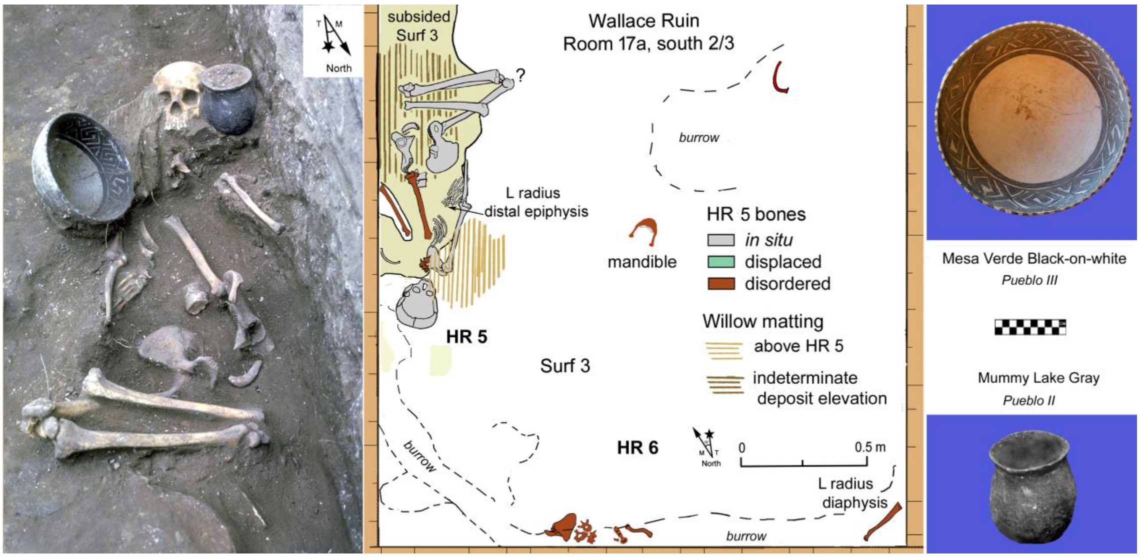


Fig. B.6: HR 5 mortuary context documentation: field photograph, left; plan map, centre; accompaniments, right.

SUMMARY INFORMATION

Human Bone Deposit: Primary Burial

Age Group/Estimated Age*:* Adolescent (older)*;* 15 y ± 36 m, dentition; 15-18 y, skeletal development

Sex: Female

Location: West Arm; Room 17a, by West wall (centre), Surface 3; same elevation as HR 6

Chronological Period: Pueblo III; MV B/w c. AD 1180-1280; similar time frame as HR 6 (pooled ceramic and AMS date AD 1180-1203, 95.4% probability)

Mortuary Context Type: Surface Room Floor

Accompaniments**:** Mesa Verde Black-on-white bowl; Mummy Lake Gray jar (Pueblo II); willow stick mat above and possibly below skeletal remains

The small, upright grayware jar is between the cranium and the west wall, almost in direct contact with the left zygomatic. The Mesa Verde Black-on-white bowl is adjacent to the right shoulder. The jar rests directly upon Surface 3, but the bowl sits upon a remnant of a willow stick mat that overlies this floor. This bowl is in a tilted orientation due to floor subsidence.

The remnant of willow stick matting visible in the field photo above extends from a point 2-3 cm superior to the lateral margin of the right orbit to a location superior to the right elbow. This material directly overlies the cranium and the humerus, and it is betwixt the base of the bowl and the disposal surface. A poorly preserved mat remnant is within the region of the pelvis and lower limbs. Whether it was above or below the corpse at deposit is indeterminate.

ANTHROPOLOGIE DE TERRAIN

Synopsis

The skeleton of this adolescent female is well represented but comparatively few bones are *in situ*. The corpse of HR 5 was deposited upon the prepared (lower) Pueblo III floor and against the west wall, in an area roughly halfway between the north and south walls. Subsequently, burrowing animals undermined most of this deposit locus, creating a shallow, irregular region of subsidence. In addition, burrowing within the volume of the corpse produced element displacements and the re-location of many bones throughout Room 17a. Animals transported the mandible, most thoracic elements, the left radius, all left upper limb bones apart from the radius diaphysis, the right hand, the left femur and fibula, and most of the foot bones from the mortuary locus. Most of these disordered elements were located in burrows, other than a few vertebrae and bones from the upper and lower extremities. As is highlighted in the plan map above, the left radius diaphysis is in the southeast corner of the room though its distal epiphysis is still in anatomic position. Disordered elements within the thoracic area include a few thoracic vertebrae, the left humerus and the right radius. The radius rests upon a small island of Surf 3 that is adjacent to the west wall, though the left humerus is on the area of Surface 3 that is subsided. Also within this natural depression are the ossa coxae, which are in approximate to close anatomic position, but the sacrum is elsewhere within Room 17a. All long bones from the right lower limb are present, as are the patella and a few tarsals. The left lower limb is represented by the tibia only.

Nevertheless, there is sufficient evidence to demonstrate deposit on the back, with the right upper limb in extension, lower limbs semi-flexed and feet positioned near midline and about a foot-length inferior to the hips. Bone displacement evidence suggests a change in right knee elevation and associated alterations to limb angles since deposition; this may be the case for the left limb but there is more uncertainty since the femur was removed from the mortuary locus by burrowing animals.

Position of skeleton relative to disposal surface

The *in situ* cranium, right scapula, right upper limb, and left hand rest upon the prepared Pueblo III floor. The occipital is in direct contact with the disposal surface; the slight inferior tilt of the cranium means that it presents antero-superiorly. The atlas (C1) was adjacent to the cranium, but its discovered orientation is unknown since this level of detail was not recorded in the field. However, the position of the cranium relative to the right scapula and upper limb is consistent with standard anatomic position. The locations of the adjacent pots and the overlying mat remnant signals that the cranium is still in or very close to its orientation at deposit.

The right scapula, which lies flat upon the undisturbed region of Surface 3, and the humerus are in standard anatomic position; the unfused but articulated humeral head is in direct contact with the glenoid cavity of the scapula. The humerus and the articulated ulna are in extension and sit adjacent to the few *in situ* ribs. Both long bones present anterior-medially whereas the ribs present dorsally. The distal end of the ulna has slight dry-bone fracture. The mid-shaft of the ulna directly overlies the nearly complete left hand, positioned on the right side of the corpse at deposit. All bones in this extremity are in anatomic position relative to each other and to the unfused distal epiphysis of the left radius. The left hand presents the posterior surface. Even though the right knee is on Surface 3, there is some uncertainty regarding the left os coxae or lower limbs are *in situ.*

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, the ordered arrangement of the skeleton and the presence of grave goods.

Labile connections: complete left hand; distal diaphysis of the left radius is in anatomic position relative to the hand; right femur head-acetabulum?

Persistent connections: right shoulder; right elbow

Evidence for material effect on anatomic position

The inferior flattening of several ribs into the thoracic cavity provides the only incontrovertible evidence for a significant change in element position during decomposition. Several factors point to a change in right knee elevation, and possibly the left. The position of the right femoral head relative to the acetabulum cannot be confirmed retrospectively, but it does appear to be in relatively close anatomic position. The lateral surface of the lateral femoral condyle rests upon a region of the intact disposal surface. The tibia is displaced inferiorly 5 cm or so from the femoral condyles; their position relative to the posterior tibial plateau is consistent with hyperflexion of the knee as is the posterior movement of the patella into this joint space (Pinskerova, et al., 2009). However, the open space between HR 5's femur and tibia is perhaps four times greater than that observed in radiographs of living individuals or cadaver sections (ibid.:Figs.5 and 6). Although the opening of this joint space is beyond anatomic position, it is not so excessive to exclude the possibility that such a post-depositional shift in position could not have occurred even if sediments covered the skeleton. The configuration of the talus relative to the distal tibia cannot be ascertained retrospectively. The angle of abduction is at maximum normal ROM (55°). Even though the left femur is absent, the tibia is in approximate anatomic position at the least.

Assuming that the discovered location represents the original deposit elevation of HR 5's knees, a generally supine position in which the torso and lower limbs skewed to the right is a reasonable possibility. That the torso was tilted somewhat to the right is consistent with the presence of the left hand beyond the thorax on the right side of the corpse; to reach this location, the left shoulder would have been somewhat elevated above the deposit surface and oriented medially. Another option is that this discovered orientation reflects post-deposit changes to the mortuary locus. Potentially, the left os coxae was flat on the surface, with lower limbs with knees upright. During decomposition, the knees shifted to the right and down, during which course the femur head dragged the os coxae into its current verticalised orientation. Such alteration in position could be due to gravitational effects or because of disposal surface subsidence. Then, at some later date or after complete skeletisation, the sacrum and the left lower limb and foot bones were dispersed by animals. Considering the proximity of HR 5 to the locus of intrusion through the west wall, it is entirely possible that the disturbance of all skeletised remains in Room 17a largely date to this incursion since it would have made the room even more accessible to animals.

Evidence for deposition in a void

The available evidence is insufficient for a conclusive determination regarding deposition in a void or an open space. Rib flattening occurs regardless of deposit environment unless an object exterior to the corpse maintains ribs in their anatomic position through a “wall effect” (Duday, 2009). Evidence regarding the original elevation of the knees is uncertain due to the potential effects of animal burrowing on the lower limbs. The right radius and left humerus are displaced within the thoracic cavity. Duday (2009) advises that bloating can displace forearms crossed over the lower abdomen at deposition, and that such abdominal expansion is more likely to displace bones considerably in an open space since the weight of soil will prevent significant expansion when a body is interred. However, it is unlikely that the extreme transverse orientation of HR 5’s left upper limb, as indicated by the *in situ* left hand, represents a superio-lateral movement during putrefaction. The angle of the *in situ* distal radius epiphysis and the articulated left hand indicates a diagonal arrangement across the chest at a location superior to the lower torso. That the *in situ* right ulna directly overlies the left hand is another point against a post-deposit displacement of this extremity. Moreover, the current locations of the left humerus and right radius within the mortuary context would not have occurred until corpse decomposition was well in progress.

Range of Motion:

The measured ROM angles are reported in Figure B.7. Knee flexion is within normal parameters, but all other angles are either non-anatomic or uncertain due to possible change in the left os coxae by burrowing animals.

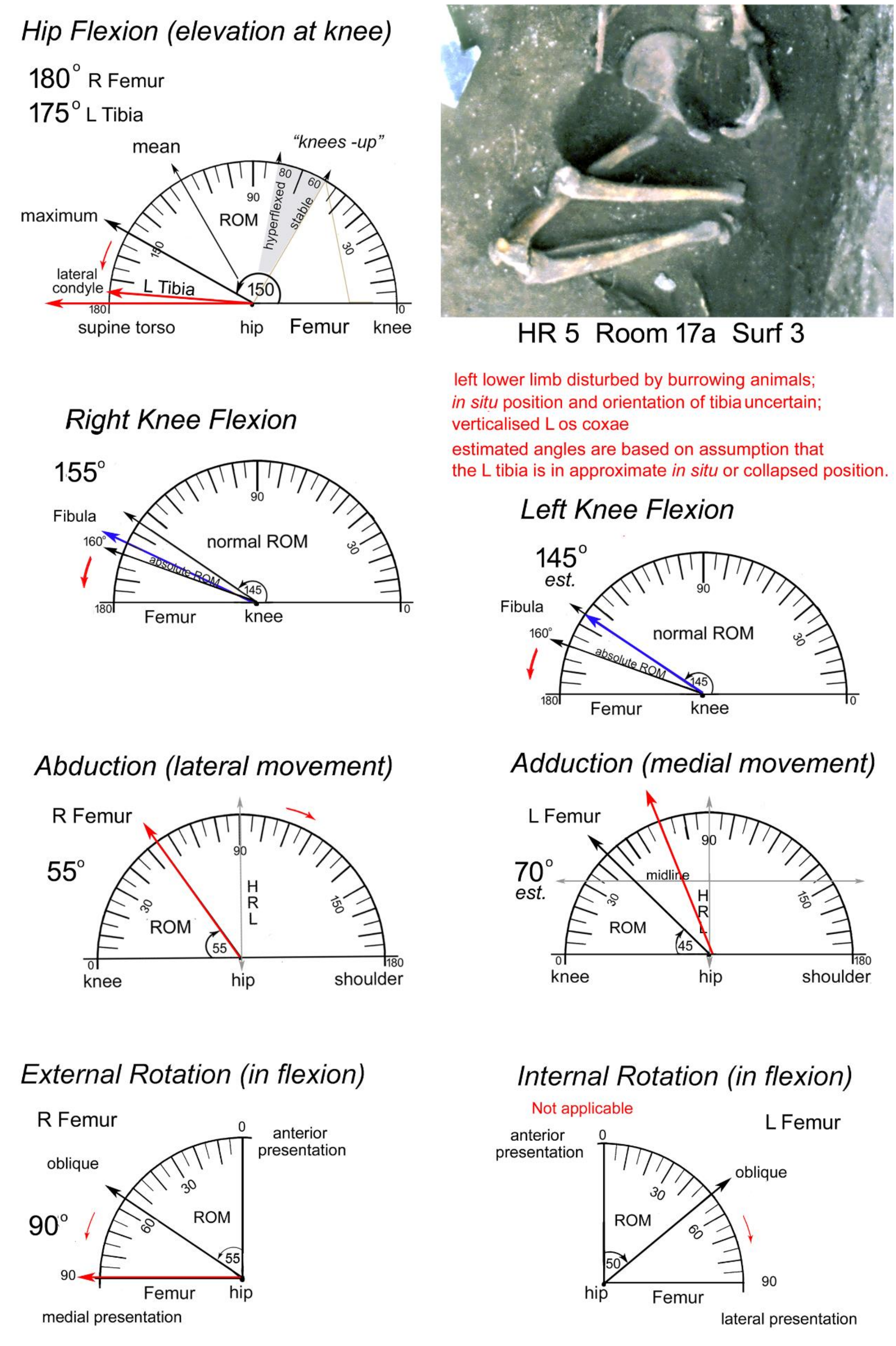


Fig. B.7: Range of Motion angles for HR 5.

INTERPRETATION

The application of archaeothanatology methods is of limited interpretive value in respect to HR 5. The displacements of long bones are the most commonly observed shifts of bones from anatomic position at Wallace Ruin. However, those of HR 5 are either attributable to displacements by animal burrowing at some point during Stage 5 corpse decomposition (skeletisation), or they are impossible to evaluate due to undermining and modification of the deposition surface during this action. Even so, the anatomic position of the right patella suggests that the knee has not changed position substantially.

The lower limbs are flexed on the torso to the right, with the right knee in direct contact with Surf 3. Such a position would not have been possible if the hips lay flat upon the surface. However, as shown in the field photograph of HR 14, such flexure on the torso would have been possible if the lower torso and lower limbs were twisted to the right at deposit. The combination of one vertical iliac blade (L) and one horizontal blade (R) in HR 5's ossa coxae is consistent with that of HR 14, whose lower limbs were flexed to the right at deposit; the left knee of the intertwined limbs is just slightly above the disposal surface. On the other hand, if HR 5 was knees-up at deposit, a lateral movement of the limbs to the right during decomposition in a void could have dragged the right os coxae into its current position as the femur head pulled on the acetabulum. That the right patella is in close anatomic position lends support to an interpretation that the ossa coxae and the lower limbs are *in situ*, though there is also the possibility that it was held in place by the willow matting, or possibly shrouding. The interpretation of this mortuary micro-environment from skeletal evidence is thus uncertain since credible arguments can be made for or against deposit in a void. On the other hand, stratigraphic and material culture evidence does not indicate that HR 5 was overlain by anything other than a willow stick mat.

HR 6

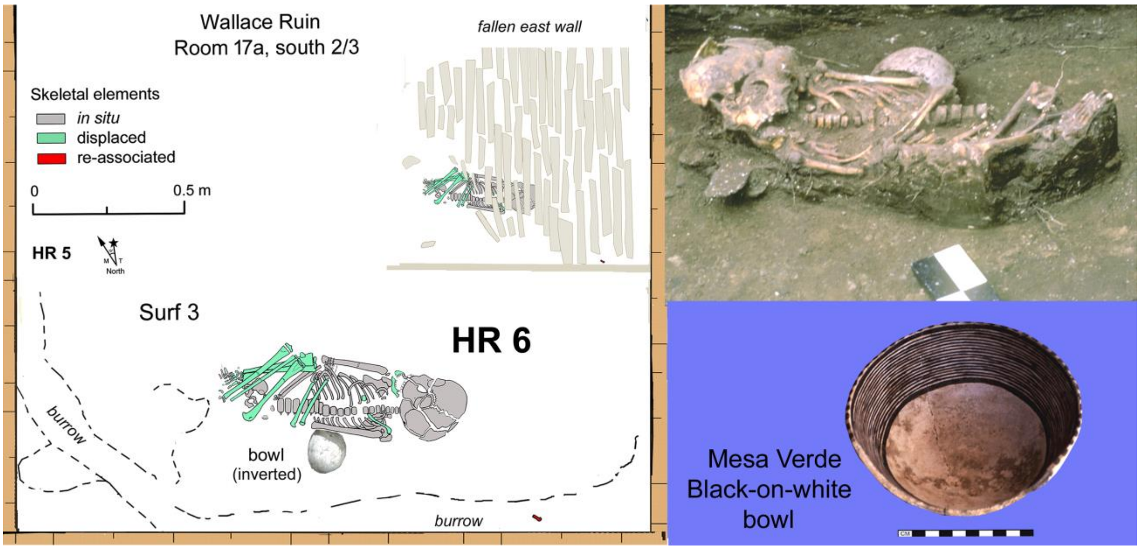


Fig. B.8: HR 6 mortuary context: plan map, left; field, top right (pedestal cuts into the underlying stratum) lower stratum d; accompaniment, bottom right.

SUMMARY INFORMATION

Human Bone Deposit*: Primary Burial*

Age Group/Estimated Age*:* Child; 8 y ± 24 m, dentition

Sex*:* Unknown (skeletal immaturity)

Location*:* West Arm; Room 17a, near South wall (centre), Surface 3 (prepared Pueblo III floor); same elevation as HR 5

Mortuary Context Type*:* Surface Room Floor

Accompaniments: Mesa Verde Black-on-white bowl; indirect evidence of shrouding (skeletal element displacement)

Chronological Period: Pueblo III; MV B/w c. AD 1180-1280; pooled ceramic and AMS date, AD 1180-1203, 95.4% probability

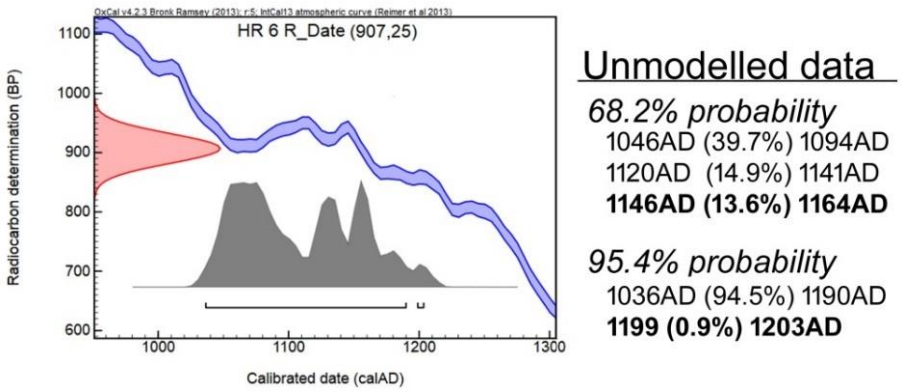


Fig. B.9: Uncalibrated radiocarbon (AMS) dates for HR 6. (ORAU).

Synopsis

This child's skeleton is well represented, and most bones are *in situ.* The skeleton is supine; the left upper limb is flexed at a near right angle across the abdomen, and the right is loosely flexed across the lower abdomen. The lower limbs are tightly flexed on the torso, with knees pointing to the right. The cranium presents the antero-right surface, but its orientation at deposition is unknown. Although the skeletonised remains were protected by overlying silty fill (Stratum 7) by the time the east wall collapsed as a unit onto Surf 2 in this quadrant of the room, the weight of the wall produced dry-bone compression fractures of the unfused vault bones. The mandible, which was broken apart post-mortem, is displaced inferiorly from the cranium. Infra-cranial elements are generally in good condition, though many long bones and ribs have complete transverse or longitudinal fractures consistent with dry-bone damage. Stratigraphic evidence indicates that the skeleton was covered with silty fill prior to the collapse of the east wall into STR 17. Rather than direct impact from falling stones, the skeletal damage characteristics are consistent with indirect compression, probably from the weight and force of impact from the fallen masonry wall; alternatively, some of the damage could have resulted from fill compression as people walked over the few centimetres of overlying fill during the deposition of the overlying HR 3. Two metacarpals found in rodent disturbed areas in the central area of STR 17 or in the rodent burrow between HR 6 and the south wall. The loss of right clavicle, right patella, proximal tibial epiphysis, and various hand and foot bones is due to animal burrowing. Numerous intact labile connections are present, and several unfused epiphyses are in approximate to close anatomic position. However, the right foot is not in a natural position. Also, displacements of several persistent joints indicate major shifts in position during decomposition within an open space.

Position of skeleton relative to disposal surface

The occipital and right temporo-parietal region rests upon disposal Surface 3, as does the posterior surfaces of the vertebral column, scapulae and the right ilium. the presentation of the left ilium is unknown, but the pubis and ischium present the dorsal surface. Both shoulders are in direct contact with Surface 3, as are the right elbow and wrist; the distal end of the left humerus rests upon the inferior rib cage. The proximal end of the right femur diaphysis sits upon the floor, but the proximal end of the left femur diaphysis projects slightly below floor level into an animal burrow. The right knee is slightly above floor level, and the left knee sits directly on the proximal end of the right tibia. Neither the elevation of the left hind foot in relation to the deposition surface or its precise proximity to the distal tibia can be determined from the field documentation. However, the distal ends of the metatarsals are some 8 cm above Surface 3 at an angle of about 60° (relative to Surface 3). Few of these *in situ* foot bones were mapped; the most reliable statements are that the bones of the mid-foot are in approximate anatomic position, that the metatarsals are not in contact with the deposit surface and that they project upwards at much the same angle as the bones of the right foot. The largely complete and articulated right foot is comprised of all tarsals, metatarsals, proximal phalanges and one middle phalanx of unknown ray. It is in close anatomic position to the right tibia. The right foot also projects upwards at an angle of 60°, and is about 6 cm above Surface 3 at its highest point.

Positions of elements relative to other skeletal regions

Three unfused sternebrae are in approximate anatomic position just left of the vertebral column and betwixt the first left rib and the left superior scapula; the manubrium is missing.

The left clavicle rests directly upon the midsection of the 1st rib; the proximal end is in standard anatomic position, but its sternal end is in contact with the supero-posterior rim of Thoracic vertebra # 4. The right clavicle is missing.

The left shoulder is in contact with the deposition surface and the elbow rests directly upon the left inferior rib cage (Ribs 8-10). The forearm is in pronation and displaced inferiorly some 2-3 cm. The proximal ends of the ulna and radius diaphyses are in standard anatomic position in relation to each other, but the distal ulna is displaced inferiorly.

The distal ulna is overlain by the inferiorly flattened lower right ribs 8-10. The left hand is palm down, in extension, and overlain by right ribs 7 and 8; the metacarpal shafts and unfused heads are in contact with the deposition surface although several proximal and middle phalanges rest directly upon the distal half of the right humerus diaphysis.

The nearly complete flexed left lower limb is in close anatomic position and rests upon the hyperflexed right lower limb. The knee is oriented towards the northeast. The diaphyses rest upon the medial diaphysis of the right tibia; the epiphyses of the knee and the patella project beyond the right lower limb and are in anatomic position upon silty fill.

The left foot is overlain by the right foot. The distal ends of the metatarsal shafts extend beyond the right foot and point to the north. It is not possible to determine their surface presentation.

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, the ordered arrangement of the skeleton and the presence of grave goods.

Labile connections: left hand; numerous epiphyses; skeletal immaturity precludes evaluation of the femoral-acetabulum connection;

Persistent connections: shoulders, right elbow; vertebral column; the unfused left pubis and ischium are in standard anatomic position.

Evidence for material effect on anatomic position

The near-vertical alignment of the left clavicle indicates the child was tightly shrouded. The configuration of the right foot, and probably the left, are also indicative of displacement of an anatomic unit supported by an organic material. The articulated right foot is in close anatomic position to the tibia. The calcaneus is oriented in the same direction as the tibia, and is slightly below the elevation of the other foot bones. The talus is not articulated with the distal end of the tibia but is at a slightly higher elevation; the talus articulates with the navicular, which also articulates with the unfused proximal epiphysis of the Ray 1 metatarsal. Of the middle and distal phalanges, only the middle phalanx (Rays 2-4) is present. The right foot is oriented posteriorly, well beyond the normal range of motion, and it presents the anterior surface; it is also several cm above the deposit surface. Relative to the position of the tibia, it should be pointing northerly and presenting medially. This foot also projects upwardly at a roughly 60° angle. The distal ends of the metatarsals are about 8 cm above the deposition surface. The close articulations of the *in situ* bones indicate that the labile connections were still intact when the foot moved into this position. The standard anatomic relationships of these elements also suggest that they were held in place, and elevated above the level of the floor, by an organic material, such as a sandle, moccasin, or shrouding, until enough soft silty fill accumulated to support and maintain the position of the individual bones. Since the left foot is covered by the right foot, a similar appraisal of anatomic relationships is almost impossible. However, its location directly beneath the right foot, and its apparent angulation, suggests that this extremity also was held in this upright configuration by organic materials.

Evidence for deposition in a void

The absence of sediment between the two layers of fractured cranial vault fragments indicates that the cranium was whole and essentially empty prior to the collapse of the wall, as opposed to the comparatively rapid infilling with sediments that occurs when a corpse is interred (Duday, 2009). The single sternebra is out of position inferio-laterally, which is consistent with the change in angle of the clavicle and also the influence of gravitational forces during putrefaction. The proximal ends of the left forearm are displaced inferiorly from the distal humerus diaphysis.

The greatest changes from anatomic position are observed in the bones of the lower limbs (Fig. B.10). All measured angles exceed normal Range of Motion (Fig. 8.11). For clarity's sake, the bones in this figure are labelled and colour-coded by side.

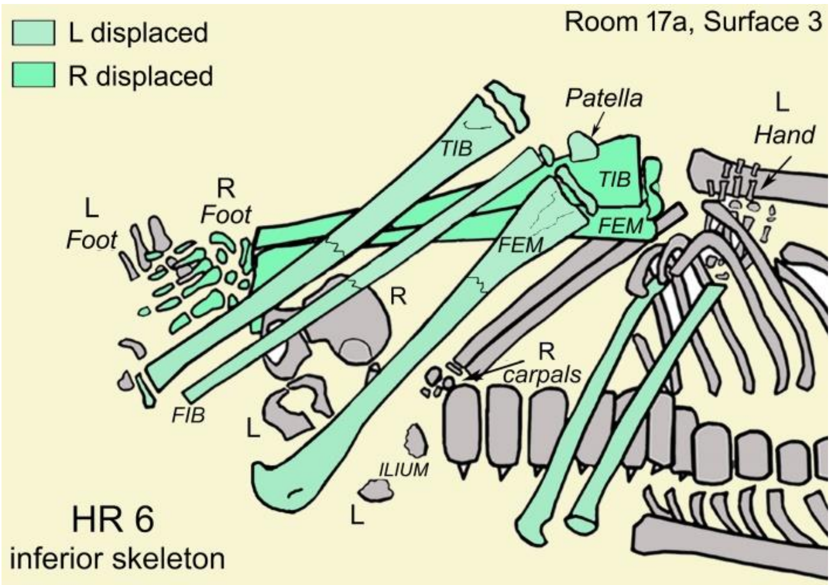


Fig. B.10: Map of inferior skeleton of HR 6 documenting the skeletal displacements occurring during decomposition in an open space.

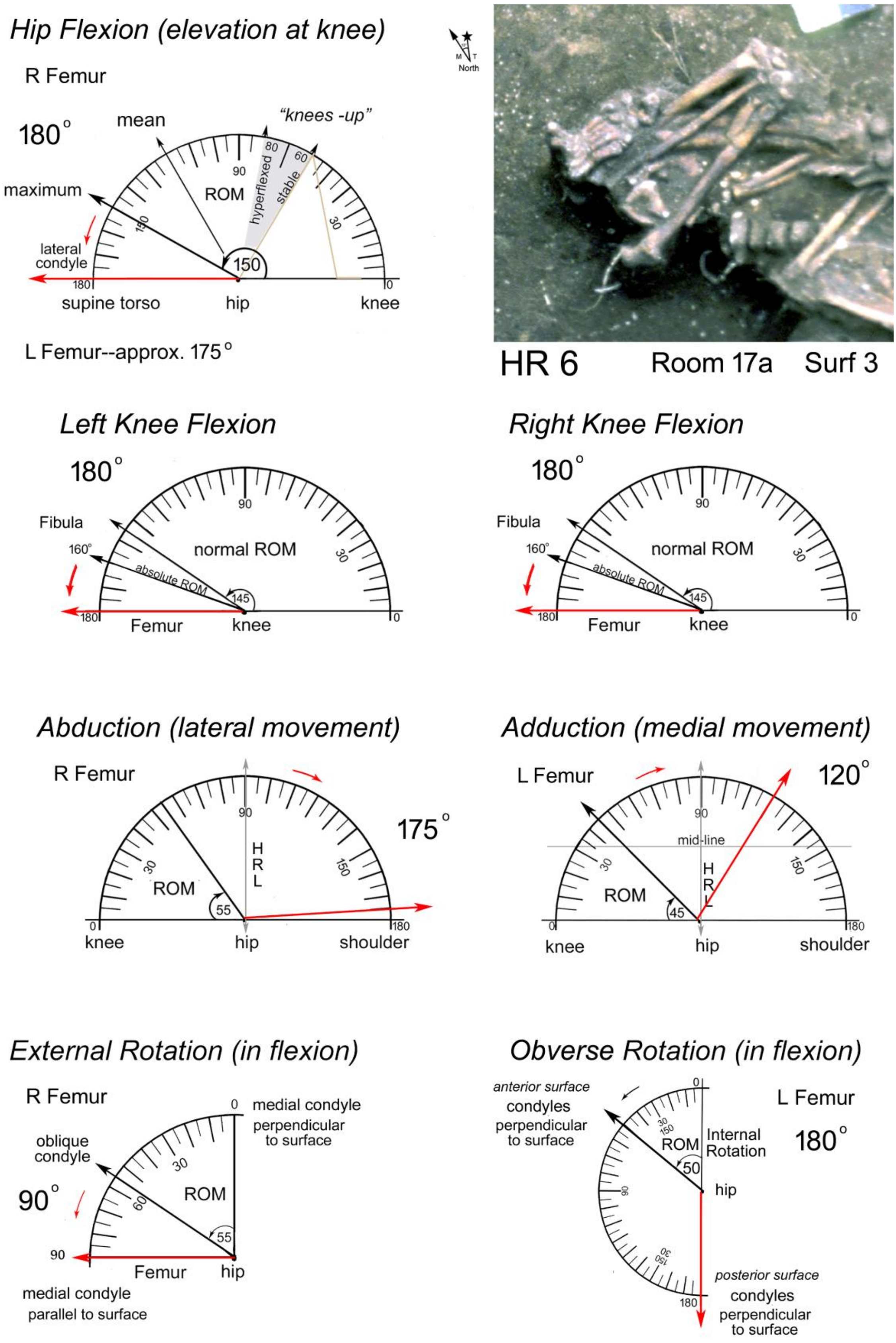


Fig. B.11: Lower limb ROM angles of HR 6.

The left femur diaphysis is rotated medially and the left femoral bones (diaphysis and epiphyses) are displaced inferiorly as a unit. In relation to the femur, the tibial diaphysis and proximal epiphysis are not in a natural position. Rather than presenting the lateral surface, the lower leg diaphyses and at least one epiphysis have rotated antero-posteriorly as a unit. The left patella rests upon the right tibia, both slightly below and beyond anatomic position. The right leg (tibia and fibula) are in close anatomic position but hyperflexed on the femur. This degree of flexure is not possible in an adult, but since young children are more flexible, the occurrence of hyperflexion may not be a reliable indicator in this case. On the other hand, the right distal femur epiphysis is adjacent to the proximal epiphysis of the tibia, but it presents the posterio-inferior surface whereas the proximal tibial epiphysis presents the medial surface. The elevation of the right foot unit is several cm above the deposition surface. Though it is in close anatomic position in relation to the tibia, the foot has rotated as a unit. Close articulations among the short bones indicate that the labile connections were still intact when this occurred.

INTERPRETATION

Numerous changes from anatomic position among the length of the skeleton herald corpse decomposition in an open space. Though comparatively subtle, the location of the sternebra and the left clavicle signals gravity-based, diagonal displacements during decomposition. The inferior displacement of the left forearm points to deposit within a void. The location of the left wrist on Surface 3, and the covering of the distal end of the forearm by the flattening of ribs, could have occurred regardless of deposit environment since these movements represent simple downward movements into the empty volume of the thorax during decomposition. The movement of facial bones and vault fragments into the empty cranial vault space is induced by the weight of the fallen east wall.

Shifts from anatomic position within the lower limbs provide incontrovertible evidence for deposit in an open space. Numerous long bones evidence rotation on an axis, often in concert with an epiphysis. The total hyperflexion of the right tibia on the femur is possibly beyond anatomic position as well. The posterior rotation and anterior presentation of the right foot is also diagnostic of decomposition in an open space.

All together, these displacements signal a change in position from an upright knees configuration at deposit, followed by collapse onto or just above Surface 3. The dorsal presentation of the left ischium and pubis allows two interpretations. In the first case, it may mean that the lower limbs were flexed to the right at deposit. Alternatively, it signals deposit with the left, or both, knees in a vertical orientation, followed by their collapse to the right when connective tissues within the tripartite joint still joined the three unfused os coxae elements. The pattern of displacements within the lower limbs supports the second scenario. The elevation of the right foot unit several cm above the deposition surface and its somewhat posterior orientation indicates that it rotated into its current position when the lower limbs collapsed from an upright knees postural arrangement.

The retention of anatomic position of this foot unit and within several diaphysis-epiphysis articulations indicates that this downward movement represents the effects of gravitational forces during Stage 4 decomposition, when soft tissues still existed and when bones retained ample collagen. Over time, silty fill (Stratum 7) accumulated over the entirety of HR 6. The presence of dry-bone fractures, consistent with compression damage rather than direct impact, means that the east wall collapsed after corpse decomposition had attained complete skeletisation Stage 5.

HR 7

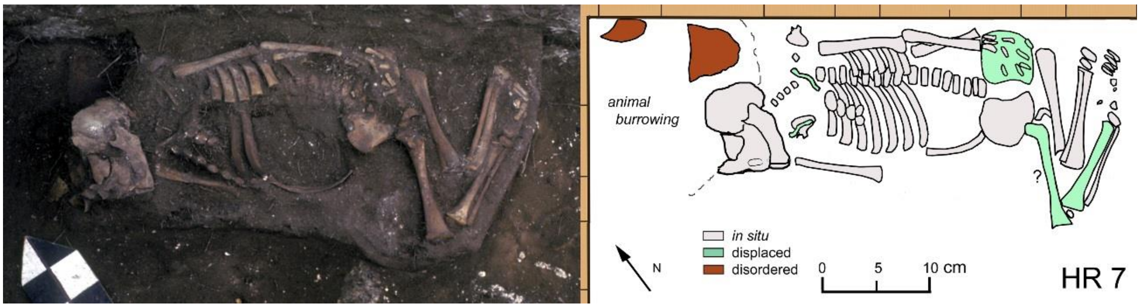


Fig. B.12: HR 7 mortuary context: field photograph, left; drafted plan, right.

SUMMARY INFORMATION

Human Bone Deposit*:* Primary Burial

Age Group/Estimated Age*:* Infant; 9 m +/- 3 m

Sex: Unknown

Location*:* Room 7a, Surface 2; near the NW corner, against the north wall

Chronological Period: Pueblo II; underlies Pueblo II cultural fill

Mortuary Context Type: Surface Room Floor

Accompaniments*:* no non-perishable remains

ANTHROPOLOGIE DE TERRAIN

Synopsis

Bones are primarily *in situ*. The superior cranial bones (parietals and hemi-frontals) are displaced within the nearby northwest corner of the room, within a region of animal burrowing. The skeleton is on the right side with semi-flexed lower limbs, and knees pointing anterior-inferiorly; the feet are positioned near midline approximately 10cm inferior to the hips. The extended upper limbs are adjacent to the torso. The right radius, hand and several foot bones are missing. The right tibia is displaced inferiorly from the right femur, but the fibula is in anatomic position relative to the tibia.

Position of skeleton relative to disposal surface

The laterally positioned skeleton rests directly upon the second, or upper, of two Pueblo II prepared floors. The left ilium lies flat upon the floor and presents the posterior (dorsal) surface. Both knees rest upon the floor.

***Positions of elements relative to other skeletal regions*:** left hand on left ilium.

Evidence for a primary burial deposit

Designation as a primary burial is based on the presence of intact labile connections, persistent anatomic connections, and an ordered skeletal arrangement.

Labile connections: probably, one or two rays of the left hand; femur heads appear to be in anatomic position with the unfused tripartite hip bones.

Persistent connections: Include: vertebral column; shoulders; right knee

Evidence for material effect on anatomic position

none; the verticalization of the clavicles could be related to the lateral postural arrangement.

Evidence for deposition in a void

Dropping of the left ilium onto the disposal surface; inferior displacement of the right leg from the femur; possible abnormal external rotation of the right femur, which presents the posteriorly rather medially or obliquely. The inferiorly displaced tibia and fibula present anteriorly, so that the fibula is fully exposed rather than obscured by the tibia; the presentation of the anterior surfaces of both bones are consistent with an abnormal internal rotation of the leg as a unit. In contrast, the adjacent left femur and leg bones are in anatomic position.

No sherds or trashy fill accumulations are amongst the skeletal elements. The characteristics of the overlying fill are uniform throughout the overlying stratum (Stratum 6) which comprises gradual accumulations of natural and cultural fill.

INTERPRETATION

This infant is allocated to a Surface Room Floor mortuary context type. ROM criteria are not available for infants, so the posterior presentation of the right femur is not construed as indicative of post-deposit rotation. However, the dropped left ilium and, especially, the inferior displacement and rotational movements of the right leg are clearly non-anatomic. In concert with stratigraphic evidence, the most plausible interpretation is that corpse decomposition for this occurred in an open space. The displacements and skeletal configurations are consistent with decomposition in a semi-flexed lateral postural arrangement.

HR 8

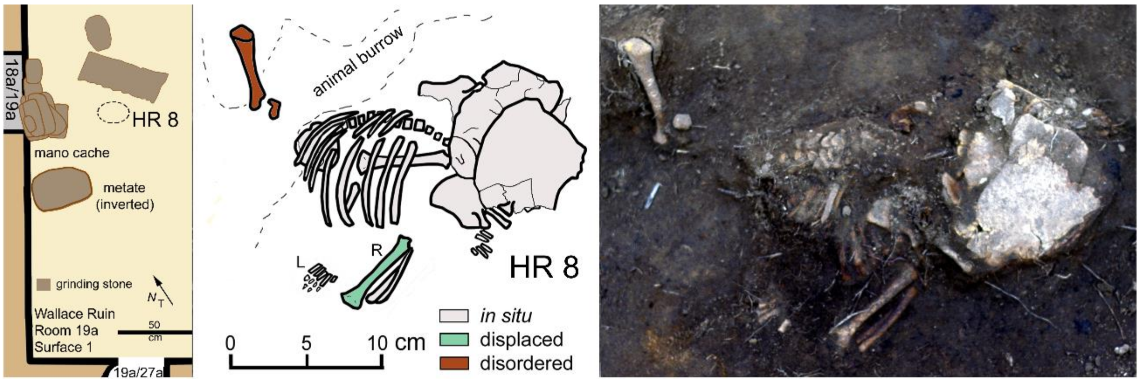


Fig. B.13: HR 8 mortuary context: drafted plan of the HR 8 mortuary context in the SW quadrant of Room 19b, left; drafted plan of HR 8 remains, centre; field photograph, right.

SUMMARY INFORMATION

Human Bone Deposit: Primary Burial

Age Group/Estimated Age: Foetus/Neonate

Sex: Unknown

Location: Surface 1, Room 19b (upper-storey)

Chronological Period: Pueblo II

Mortuary Context Type: Surface Room Floor

Accompaniments: no non-perishable objects

ANTHROPOLOGIE DE TERRAIN

Synopsis

The articulate superior skeleton of a late term foetus/neonate is on the floor of the upper-storey room 19b. The inferior skeleton has been disturbed and removed by burrowing animals. The torso is in a latero-prone position, with left upper limb under the body, and arm projecting at a roughly right angle from the torso. The radius is missing but the five metacarpals, four proximal phalanges and three intermediate phalanges are in anatomic position relative to each other. The cranium and right shoulder are face down/prone. The tightly flexed right upper limb is displaced as a unit from the scapula and a cluster of phalanges that are in anatomic position relative to each other. The inferior skeleton has been removed or displaced by burrowing animals.

Position of skeleton relative to disposal surface

Bones are in direct contact with the Surface 1 disposal surface.

Evidence for a primary burial deposit:

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, and the ordered arrangement of the skeleton.

Labile connections: hands

Persistent connections: Include: vertebral column

Evidence for material effect on anatomic position*: absent*

Evidence for deposition in a void: Surface Room Floor (probable)

INTERPRETATION

The direct association of all bones with the floor surface is certain. The very young age of the individual and the extreme disturbance of the skeleton means that a determination of the decomposition microenvironment based on skeletal displacements is unsound. However, HR 8 is not overlain by a deposit of cultural refuse and the characteristics of the overlying stratum are not specific to this locus. Provisionally, this infant is allocated to a Surface Room Floor context.

HR 9

Fig. B.14: HR 9 Mortuary context: left, with grave goods in place; central, without grave goods; green arrows point to subtle bone displacements; right, grave goods.

SUMMARY INFORMATION

Human Bone Deposit: Primary Burial

Location: Room 18a, Surf 3, Subfloor Burial Pit, Feature 7

Age Group/Estimated Age: Child, 8 ± 24 m

Chronological Period: Pueblo II: c. AD 1120-1150: after the expansion of the great house and prior to the local abandonment

Mortuary Context Type: Subfloor Burial Pit (Feature 7)

Pit dimensions: at Surface 3: roughly 60 cm long (E-W), 35 cm wide (N-S)
at base: roughly 40 cm long, 25 cm wide
depth at mid-section:
Surface 3 to base: approx. 30 cm

Feature 7 consists of an intrusive, subfloor pit cut through the prepared upper Pueblo II floor (Surf 3) and into a fill stratum betwixt Surf 3 and the original Pueblo II floor (Surf 4). This oval-shaped pit has moderately sloping sides and an uneven base. Possibly, this pit was excavated for this interment; however, length and width are insufficient for a consistent elevation for corpse deposit.

Accompaniments: Personal jewellery: San Juan red ware shaped-sherd ear ring, large McElmo Black-on-white sherd; large Mesa Verde Corrugated sherd.

ANTHROPOLOGIE DE TERRAIN

Bones are *in situ,* with few exceptions. The superior skeleton is supine, though angled slightly to the right due to the slight slope of the left side of the burial pit. The unfused cranial bones are in close anatomic position, though tilted slightly to the right. The occipital rests directly upon the sloping deposit surface. The mandible is in or close to anatomic position with the cranium, but the angle between the arches may be slightly beyond normal anatomic position. The left side of the skeleton rests upon the sloping surface that forms the north margin of the pit; consequently, the bones from the left upper appendage are at a slightly higher elevation than those of the right. The arms are parallel to the torso. The forearms are flexed across the lower abdomen.

The inferior torso skews leftwards. The vertebrae and unfused elements of the pelvis are in anatomic position, though the lumbar vertebrae and hip bones are posterior to the coronal plane at a point intermediate between a superior-inferior line passing through the left shoulder and another one at mid-line (sagittal plane). The distal diaphyses of the left leg overlie the region of the pelvis, but their proximity to that anatomic region is indeterminate. The left ilium is barely visible in the field photo, but the field map suggests that it presents the dorsal surface; it also indicates that the left ilium partly overlies the right ilium; presumably, this element presents the ventral surface but this cannot be confirmed retrospectively.

The left thigh is tightly flexed on the abdomen, and the left leg is tightly flexed on the thigh. The left femur presents the posterolateral surface; both epiphyses are in anatomic position. The left tibia and fibula are in close anatomic relation with each other and the femur; both present the anterolateral surface; the epiphyses are in close anatomic position. The right femur diaphysis is unobservable in the photograph, but the field map situates it in a close anatomic position that is tightly flexed relative to the torso and the leg. The distal femur epiphysis is visible in field photographs; it is in anatomic position relative to the proximal epiphysis of the tibia, and thus the tibia diaphysis. The right tibia and fibula are in anatomic position relative to each other, including their epiphyses. The knees are immediately adjacent to each other and point laterally to the right (south).

Articulated foot bones are in anatomic position in respect to each other and the bones of the leg. The left foot is in a natural resting position and presents laterally; the right foot follows the slope of the east margin of the burial pit and presents anteriorly.

Assessment of inferior limb angles by ROM protocols are based on the assumption that the pelvis is in anatomic position, in which case the horizontal reference line is perpendicular to the sagittal plane (mid-line). All together, the skewed and posterior positioning of the inferior vertebrae and pelvis, the general rightwards tilt of the skeleton, and the dorsal presentation of the left ilium indicate that the HR 9's pelvis was not supine at deposit. Skeletal immaturity also adds a source of error, since ROM standards are normally based on measurements involving adults. Exceptions include CDC (Soucie et al., 2010) results for children 2-8 years, but only in terms of hip flexion (maximum of 142°) and knee flexion (maximum of 154°). Limb rotation standards are probably reliable in respect to the knee, since this joint has comparatively limited rotation capability even at young ages. Evaluation of knee angle is also hindered by variation in element elevation in respect to position upon the sloping deposit surface; potentially, the angle of the 3-D joint space may be conflated, or reduced, in two-D photographic evidence. The absence of detailed evidence regarding some bone locations and surface presentations is yet another impediment to fine-tuned analysis of limb configuration in terms of ROM.

Accordingly, evaluation of ROM is not particularly suitable for HR 9, though there is nothing to suggest that there are any noteworthy variations from anatomic position. However, the presentations of the left thigh and all leg bone surfaces are consistent with deposit with limbs flexed to the right and in contact with the sloping surface of the east margin of the burial pit. possible to evaluate whether

Evidence for material effect on anatomic position

Verticalisation of the clavicles—shoulders either hunched due to constraints of the burial pit, or shrouded, though no trace of shrouding remains.

Dropped mandible: the downward displacement of the mandible may have been induced by the weight of two large sherds placed over the superior torso; the lower of these two rests directly upon the left arch of the mandible.

Evidence for deposition in fill

Labile anatomic connections: feet, hands; femur-acetabulum articulations unobservable

Persistent anatomic connections: shoulders, knees, and ankle; epiphyses

Evidence for deposition in a void

Inferior displacement of the mandible; slight downward movement of the proximal diaphysis of the left fibula

INTERPRETATION

Deposition within a filled space which maintained the observable labile connections. Void attributes in region of the torso suggests some sort of physical barrier prevented in-filling of the thoracic cavity by sediments prior to decomposition of the costo-vertebral joints. Bone condition is poor, due to location within alkaline soil in damp environment due to proximity to underlying water table. Thus, location of the vertebrae on the base of this pit may have hastened deterioration, even if there was a layer of organic material (such as a willow mat) between the corpse and the bottom of the pit. Concurrently, if such matting, or even a feather blanket, covered the body as well, such a barrier may have prevented the rapid in-filling of the thorax, allowing the ribs to flatten and the mandible to displace inferiorly. The antero-inferior tilt of the cranium, which follows the slope of the pit, may account for some of the mandibular displacement. However, additional displacement beyond anatomic connection seems to be attributable to the pressure of the weight of the overlying sherds deposited as grave accompaniments, especially if they too collected sediments that added to their weight.

HR 10

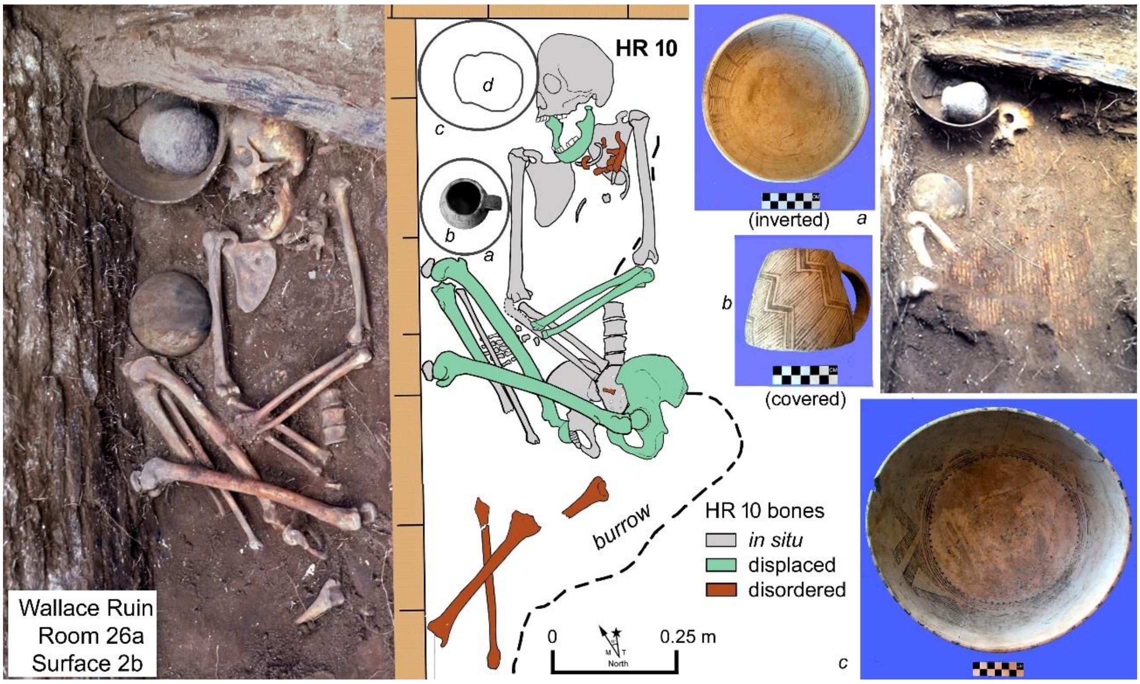


Fig. B.15: HR 10 mortuary context documentation: field photograph left, photograph by Jerry Bean; plan map, centre; a) inverted Indeterminate whiteware bowl; b) Mesa Verde Black-on-white mug; c) Mesa Verde Black-on-white bowl; d) Mummy Lake Gray jar; willow stick mat overlying HR 10.

SUMMARY INFORMATION

Human Bone Deposit: Primary Burial

Age Group/Estimated Age: Adolescent (older); 15 y ± 36 m, dentition; 15-18 y, skeletal development

Sex: Female

Location: West Arm, Room 26a, northwest corner, on Surface 2b

Chronological Period: Pueblo III; Mesa Verde B/w c. AD 1180-1280; pooled ceramic AMS probabilities: 68.2%, AD 1180-1214; 95.4%, AD 1180-1254 (very improbable beyond AD 1220s)

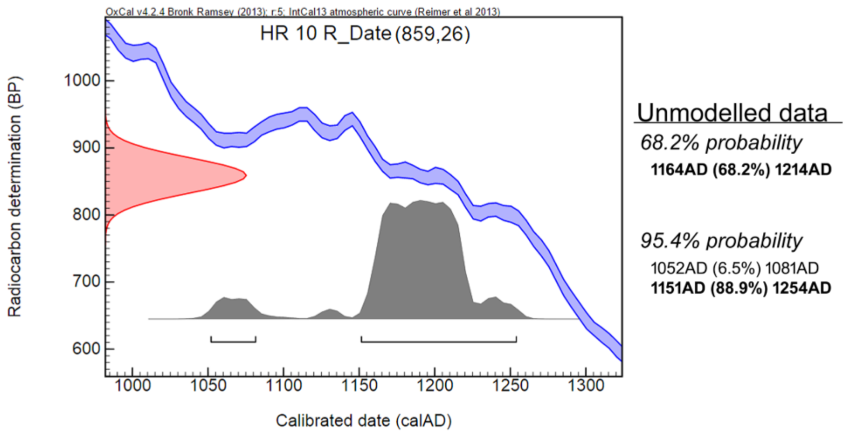


Fig. B.16: Uncalibrated radiocarbon data (AMS) for HR 10 (ORAU).

Mortuary Context Type: Surface Room Floor

Accompaniments*:* Mesa Verde Black-on-white mug; large Mesa Verde Black-on-white bowl; small, Indeterminate whiteware bowl; small Mummy Lake Gray jar; with stick willow mat

The larger of the bowls rests upon Surface 2b, betwixt the west wall and HR 10's cranium. It is unknown if the frontal was in direct contact with this bowl at deposit. The Pueblo II Mummy Lake Gray rests on its side, in direct contact with the interior surface of this bowl. The mug sits directly upon Surface 2b; it is covered by the inverted Indeterminate whiteware bowl. These two vessels are nestled between the west wall, the right humerus and the right knee.

An almost complete willow stick mat covers most of the mortuary locus, apart from the cranium, right humerus, knees and associated vessels. Though observable at excavation, the very friable remains were not salvageable. Traces of this artefact directly overlay multiple skeletal regions.

HR 10 is not overlain by cultural refuse, but she may have been deliberately covered with an informal arrangement of small slabs. Overlying wall fall contributes some uncertainty to this observation, as does the relatively undamaged appearance of the willow mat.

ANTHROPOLOGIE DE TERRAIN

Synopsis

This older adolescent skeleton is well-represented even though few thoracic bones are *in situ* due to the actions of burrowing animals. Skeletal elements are generally in good to excellent condition, apart from a few transverse dry-bone fractures. The superior skeleton is on the back (supine). The cranium presents the anterio-left surface. Animal burrowing within the region of the neck (C1-C5) and superior thorax prevents determination of the initial configuration of the occipito-atlanto (occipital condyles-C1) articulation. However, the orientation of the dropped mandible indicates that both it and the cranium are close to their original presentations, though the weight of the overlying matting may have displaced both elements to the right either during or after decomposition. The upper limbs are loosely flexed across the lower abdomen; the distal epiphyses of the left forearm and the right ulna are in anatomic position; the left hand is relatively undisturbed but all bones from the right hand were transported beyond the area of the mortuary locus. Lumbar vertebrae 1-4 (5th is sacralised), the sacrum and the right os coxae are *in situ*. The right lower limb is tightly flexed to the right; the femur, patella, superior half of the right tibia and the right fibula are in anatomic connection. Animal burrowing moved the inferior half of the right tibia, the left tibia and fibula and all bones from each lower extremity beyond the mortuary locus. A large pile of sandstone slabs overlies the mortuary locus.

Position of skeleton relative to disposal surface

The posterior surfaces of the cranium (right parietal and inferior occipital), both shoulders (scapula and proximal humerus), lumbar vertebrae, elbows, sacrum, right os coxae, right knee and right ankle (distal fibula) are in direct contact with the disposal surface. The inferior surface of the mandibular arch also rests upon Surface 2b. The right patella is in anatomic position; its anterior surface is in direct contact with Surface 2b and the west wall.

Positions of elements relative to other skeletal regions

The right distal forearm rests upon the right sacral-iliac joint, and the left wrist and distal forearm sit directly upon the proximal end of the right forearm. The head of the left femur is displaced infero-laterally from the acetabulum. The left os coxae lies flat upon the sacrum and right os coxae; it presents the dorsal surface. The left femur articulates with the acetabulum and presents laterally; it flexes tightly on the torso at a near right angle; the distal end of the shaft rests directly upon the medial surfaces of the mid-shafts of the right leg. The left patella is in anatomic position; its anterior surface is in direct contact with the west wall.

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, the ordered arrangement of the skeleton and the presence of grave goods.

Labile connections: The left femur-acetabulum connection is intact, and the right one appears is either articulated or in close anatomic position.

Of the four extremities, only the left hand is *in situ*. The undisturbed bones from this articulated anatomic unit is comprised of four carpals, five metacarpals and five proximal phalanges. Two middle and three distal phalanges are located nearby; thus, two rays of uncertain position (2-4) contain a full complement of metacarpals and phalanges. All bones from the right hand and the feet are re-associated. These include one carpal (capitate), two metacarpals (including Ray 1), five proximal phalanges, one middle phalanx and two distal phalanges. Thus, one right hand ray (2-4) has a metacarpal and all three phalanges; another ray has a distal phalanx. The left foot has five tarsals, five metatarsals and both phalanges from Ray 1. The right foot consists of 6 tarsals (all but medial cuneiform and cuboid), the metatarsals, and the proximal phalanx from Ray 1.

Persistent connections: Include: shoulders; lumbar vertebrae; right elbow, right os coxae and sacrum; right knee (including patella); left knee (femur and patella)

Evidence for material effect on anatomic position

There is scant evidence for a material effect on anatomic position. The slight, apparent hunching of the shoulders could indicate the use of shrouding. However, the extreme disturbance of the thoracic cavity by burrowing animals means that the orientation of the scapulae in relation to the alignment of the vertebral column is not accessible. The discovered location and orientation of the left clavicle is, to some unknown extent, due to animal burrowing; the lateral end is in approximate anatomic position, but the sternal end rests upon a displaced (laterally) thoracic vertebra and projects antero-superiorly. Possibly, the weight of the overlying mat accentuated the downward movement of the mandible and the left proximal forearm bones, though the effects of gravitational forces alone would have been sufficient.

A large pile of jumbled sandstone slabs in the region of the mortuary locus came from the west wall; apparently, a large section of this wall was pulled into Room 26a when the north primary beam collapsed onto natural fill (Stratum 4) that had accumulated over Surface 2a, which immediately overlies Surface 2b. The dry-bone fractures of HR 10 are more in keeping with compression damage than direct impact of wall stones. There are no indications that the weight of these stones had any effect on anatomic position. The occurrence of dry-bone fractures indicates that this event occurred well after the loss of all soft tissue connections (Stage 5, complete skeletisation).

Evidence for deposition in a void

Displacements from anatomic position involve the temporo-mandibular joint, left elbow, right hip (femur-acetabulum), lower limbs, and the left sacro-iliac joint. The dropped mandible is displaced inferiorly from the cranium and downwards onto the disposal surface.

The displacement of left upper limb involves an increase in joint space between the arm (humerus) and both forearm diaphyses; it also concerns the axial rotation of the ulna. The posterior olecranon (ulna) is some 2-3 cm inferior to the olecranon fossa (humerus). Due to the fixed nature of the humeral-ulna hinge joint, the ulna should present the same surface as the humerus. However, the ulna is rotated medially on the axis and presents the posterior surface. The proximal radius is displaced downwards from the capitulum onto the disposal surface; it is also displaced laterally, so that the radius head is just inferior to the trochlea of the humerus. The palm-down orientation of the *in situ* bones of the left hand indicates that the current posterior presentation of the radius is unchanged since primary deposition. The distal ulna and radius are in approximate anatomic position. Both distal epiphyses are in anatomic position.

The right forearm bones appear to be in close anatomic position within the region of the elbow. There is a very small gap between the radius head and the capitulum; the relationship between the proximal ulna and the humerus cannot be ascertained retrospectively. The small space between the distal ends of the diaphyses is probably normal for a forearm in pronation. The small inferior movement of the radius diaphysis is insignificant. Conceivably, this minor displacement is due to the weight of the overlying left forearm. The removal of all right hand bones by burrowing animals allows for the possibility that they also produced the equally minor displacement between the distal diaphyses. Measurements of angles pertaining to the pelvis and lower limbs demonstrate conclusively that the right lower limb is not in standard anatomic position relative to the torso. All angles are well beyond normal ROM (Fig. B.17), even allowing for methodological error. Also, the femur head is displaced latero-inferiorly from the acetabulum, to the extent that the fovea capitus is fully revealed in the field photograph. The long bones and patella are in anatomic position relative to each other, and each presents medially. However, the extreme hyperflexing (172°) of the leg on the thigh is at or beyond anatomic possibility in a fresh corpse. The location of the right knee on the disposal surface is impossible for a fresh corpse in which the supine torso rests upon that same surface.

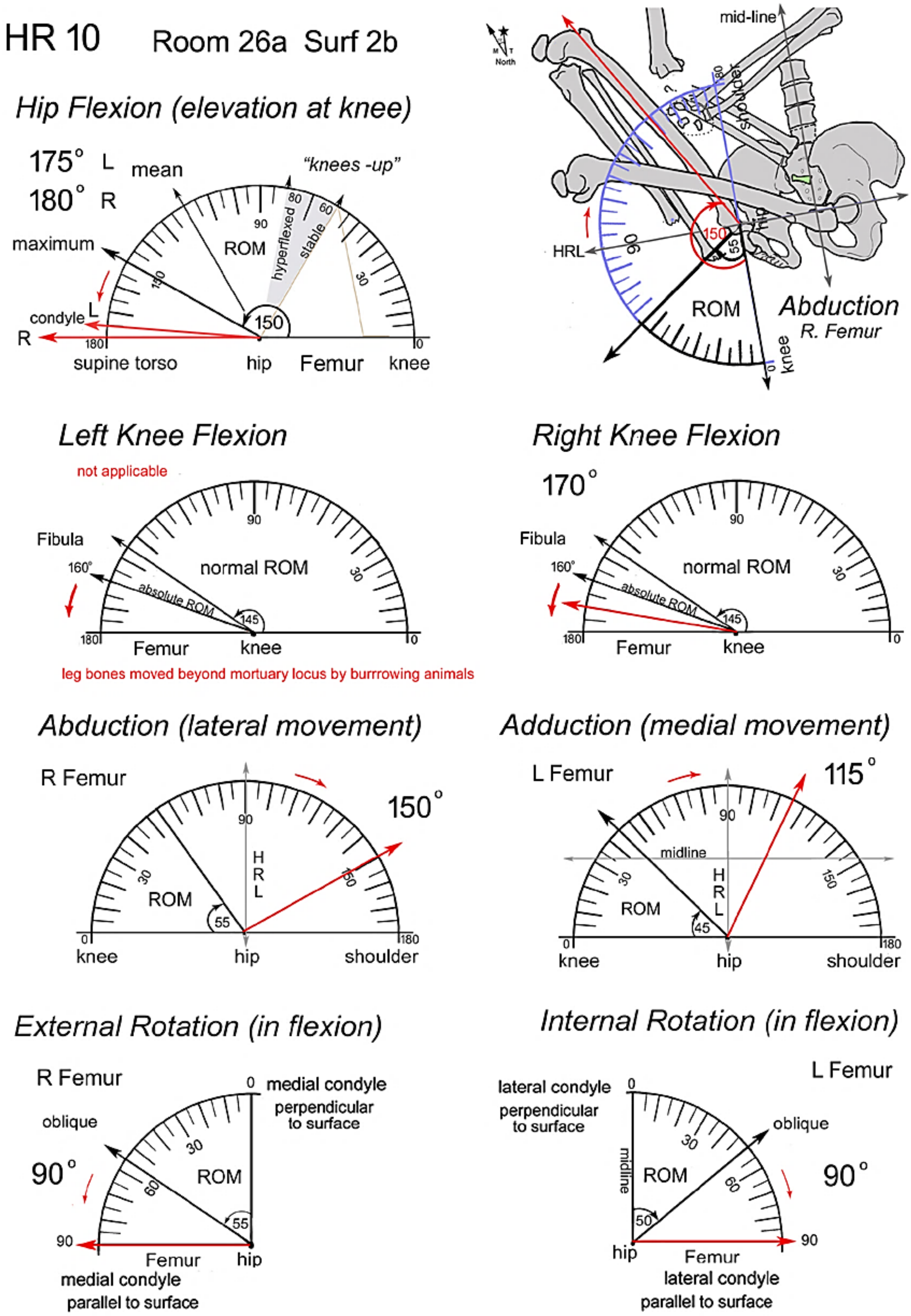


Fig. B:17: Lower limb Range of Motion angles of HR 10.

The obtuse angle of abduction evidenced by the left femur is impossible in a fresh corpse in a supine position, or even one deposited on the right side. The lateral presentation of the femur, which represents an internal, or medial, rotation would be feasible if deposition was on the right side. However, setting aside the *in situ* evidence from the superior skeleton, then the left os coxae would be verticalised.

INTERPRETATION

There is solid evidence that HR 10 was deposited directly upon Surface 2b. The disturbance of the mortuary context by burrowing animals creates interpretive complications regarding the application of *anthropologie de terrain* in terms of deposition in a void. However, the mandibular and left elbow displacements, which are from two separate skeletal regions, are suggestive of deposit in an open space. This finding is consistent with stratigraphic and material culture evidence. The apparent floor-level position of the knees is atypical for non-infant individuals on surface room floors at Wallace Ruin. Unfortunately, there is no point of reference regarding the orientation of the leg relative to the right foot since burrowing animals removed all foot bones from the mortuary locus. The flexure characteristics of the left lower limb are not assessable.

Although the appearance of the right lower limb looks “normal”, every one of the assessable ROM variables is significantly beyond normal anatomic position. Correlation of data from these independent appraisals yields these key findings. Hip flexion angles (~170-180°) for both femora are well beyond both normal (150°) and physiological ROM (165°); the lateral surface of the right femoral condyle lies flat upon the disposal surface whereas the anterior surface of the distal left femur, which rests directly upon the medial midshaft of the right tibia, is no more than 2-3 cm higher in vertical elevation. Also, abduction of the right femur (150° v 55°) is extreme, as is the hyperflexion of the right knee (170° v 145° normal/160° physiological). In addition, the superior presentation of the medial surface of the right medial femoral condyle equates to an abnormal external rotation (90° v 55°) of the femoral axis. Hip flexion/elevation of the left knee, left femur adduction and internal rotation angles are also significantly beyond anatomic possibility. In combination with the posterior presentation of the left os coxae, which lies flat upon the sacrum and right iliac blade in a non-anatomic position, these angles evidence a significant degree of downward and rotational movements concerning this limb. Independently, none of these measured angles can occur in a living person or a fresh corpse, nor can they take place when corpse decomposition occurs within a closed space (fill). Together, they point to the effects of gravitational forces upon loosening labile connections within the acetabular-femoral head joint, which culminated in the downward, superior-lateral movements of the semi-flexed lower limbs. The extreme degree of HR 10's femoral abduction and adduction do not occur in the straightforward vertical drops in elevation observed for limbs associated with an akimbo or fully-flexed postural arrangement. These two variables are thus key to the interpretation of the, perhaps, independent collapse of the lower limbs from knees-up positions: both entail extreme divergence from normal ROM that does not reflect a mere vertical drop in elevation. Rather, these measurements indicate the necessity for sufficient vertical space wherein these constellations of downward, twisting and rotational non-anatomic movements can transpire.

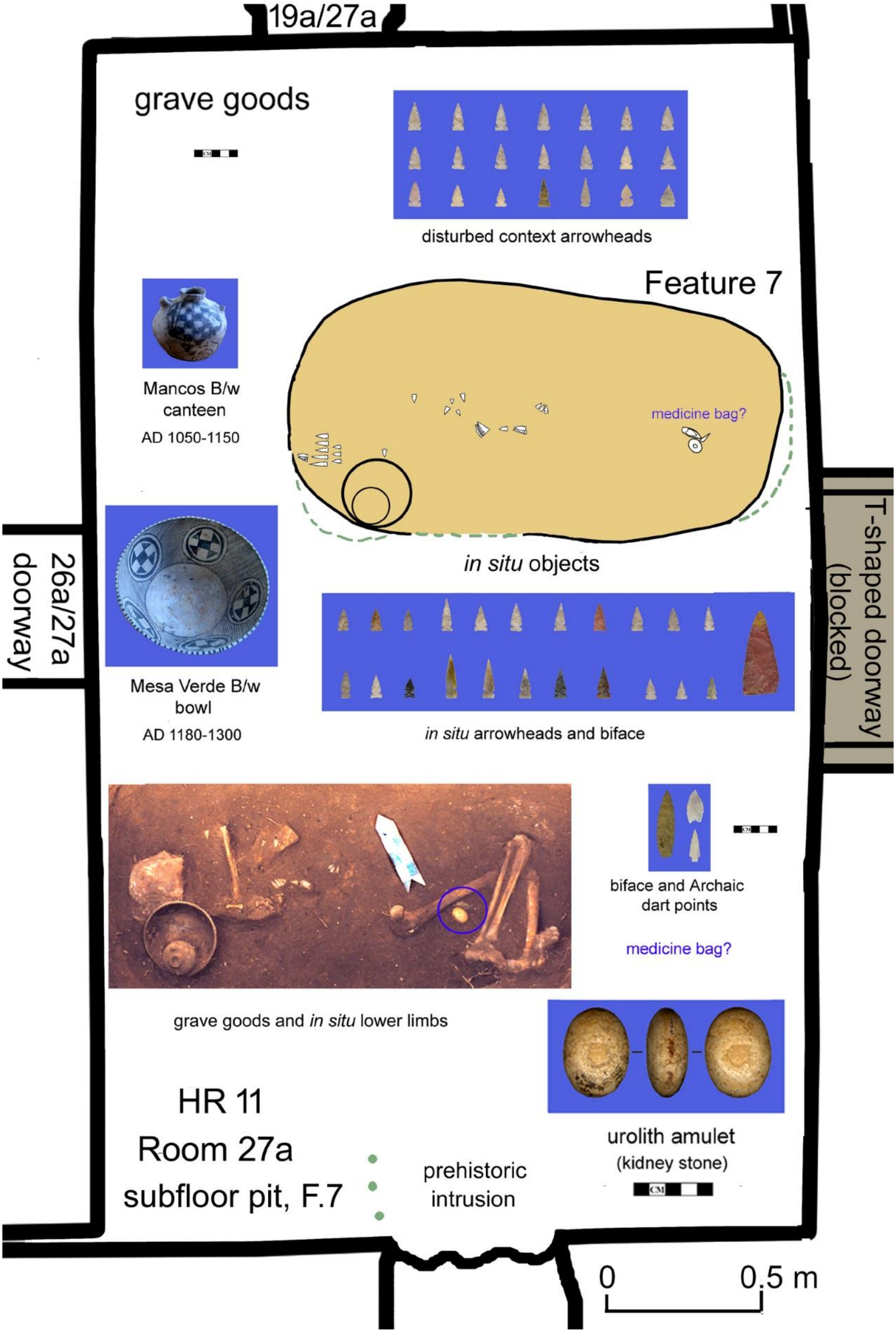


Fig. B.18: HR 11 in situ and disturbed grave goods within the intrusive subfloor burial pit (Feature 7) cut through Surface 2 of Room 27a. Artefact photographs by Bruce Bradley.

SUMMARY INFORMATION

Human Bone Deposit*:* Primary Burial

Age Group/Estimated Age*:* Mature adult; 35-40 y, skeletal development

Sex*:* Male

Location*:* Feature 7 subfloor pit, central area of Room 27a; intrusive pit cut through Surface 2

Chronological Period*:* Pueblo III; c. AD 1180-1280, Mesa Verde B/w; AMS and MV B/w c. AD 1180-1220

Mortuary Context Type: Surface Room Subfloor

Accompaniments*:* Mesa Verde B/w bowl (AD 1180-1280); Mancos B/w canteen (AD 1050-1150); 43 arrowheads, (22 *in situ;* 21 in disturbed, re-deposited fill); 1 *in situ* biface; possible medicine bag items: *in situ* biface, 2 Archaic dart points and one possible urolith amulet with circumferential residue stain (see Fig. B.18); possibly one or more items removed during the deliberate prehistoric intrusion.

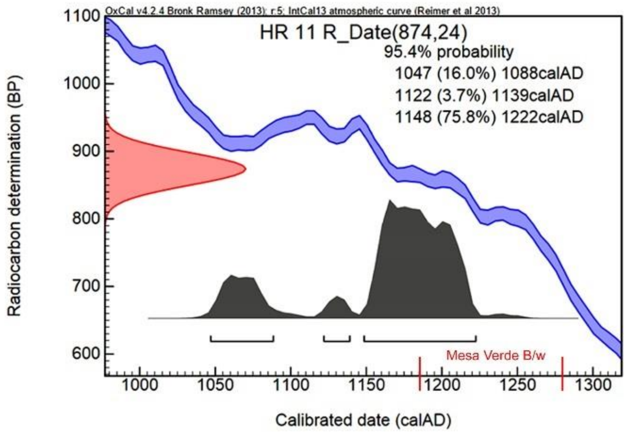


Fig. B.19: AMS results for HR 11, with dates for Mesa Verde B/w.

ANTHROPOLOGIE DE TERRAIN

Synopsis

HR 11 is in a subfloor pit (Feature 7) cut through Surface 2, a Pueblo III use surface. By inference (see below), several configurations of arrowheads possibly on shafts, were placed on the pit base, which was then overlain by a matting of some type. HR 11 was then deposited upon the left side with lower limbs semi-flexed. A Mesa Verde B/w bowl, with a Mancos B/w canteen inside, was placed in the pit near the shoulder-head region. It is uncertain if the corpse was deliberately covered with fill since all overlying sediments subsequently disturbed by humans. There is no evidence of sticks used to create a coffin-like cavity.

During the Pueblo III use of the great house, Surface 2 and thus Feature 7 were overlain with a thick stratum of constructional fill (Stratum 4).

During the prehistoric period, intruders broke through the south wall and walked across Stratum 4, excavated down through about ½ metre of clay chunk fill, dug into the pit, and removed all bones and associated artefacts except the lower limbs and possibly the two ceramic vessels. Most of the bones were then re-deposited in a cluster within the centre of the burial pit. Several re-associated bones were dispersed across Stratum 4. Despite the complete removal of all bones during deliberate post-deposit intrusion, the intact arrangements of several arrowhead clusters suggest that some type of firm matting separated them from the overlying skeletal remains removed during the disturbance. The cluster of bones in the centre of the pit suggests that they were gathered in the cloth when re-deposited. It is unknown if the pots are *in situ*, but a large urolith/amulet and three nearby Archaic points may have been in a medicine bag located posterior to the left femur midshaft, and probably overlain by the right femur until the latter was removed by the intruders.

Post-deposit intrusion: see Chapter 11 for full details.

Fig. B.20: Re-deposited bones of HR 11 within the burial pit.

Position of skeleton relative to disposal surface

The undisturbed left lower limb rests directly upon the base of the subfloor pit. Both knees and both feet are tight against the north and south sides of the pit.

***Positions of elements relative to other skeletal region**s*

The right knee is slightly above the left knee, and the toes of the right foot are nestled against the heel of the left foot. All limb angles are within normal ROM (Fig. B.21).

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, the ordered arrangement of the lower limbs and the presence of grave goods.

Labile connections: left and right foot, several rays

Persistent connections: Include: left and right knees and ankles

Evidence for material effect on anatomic position

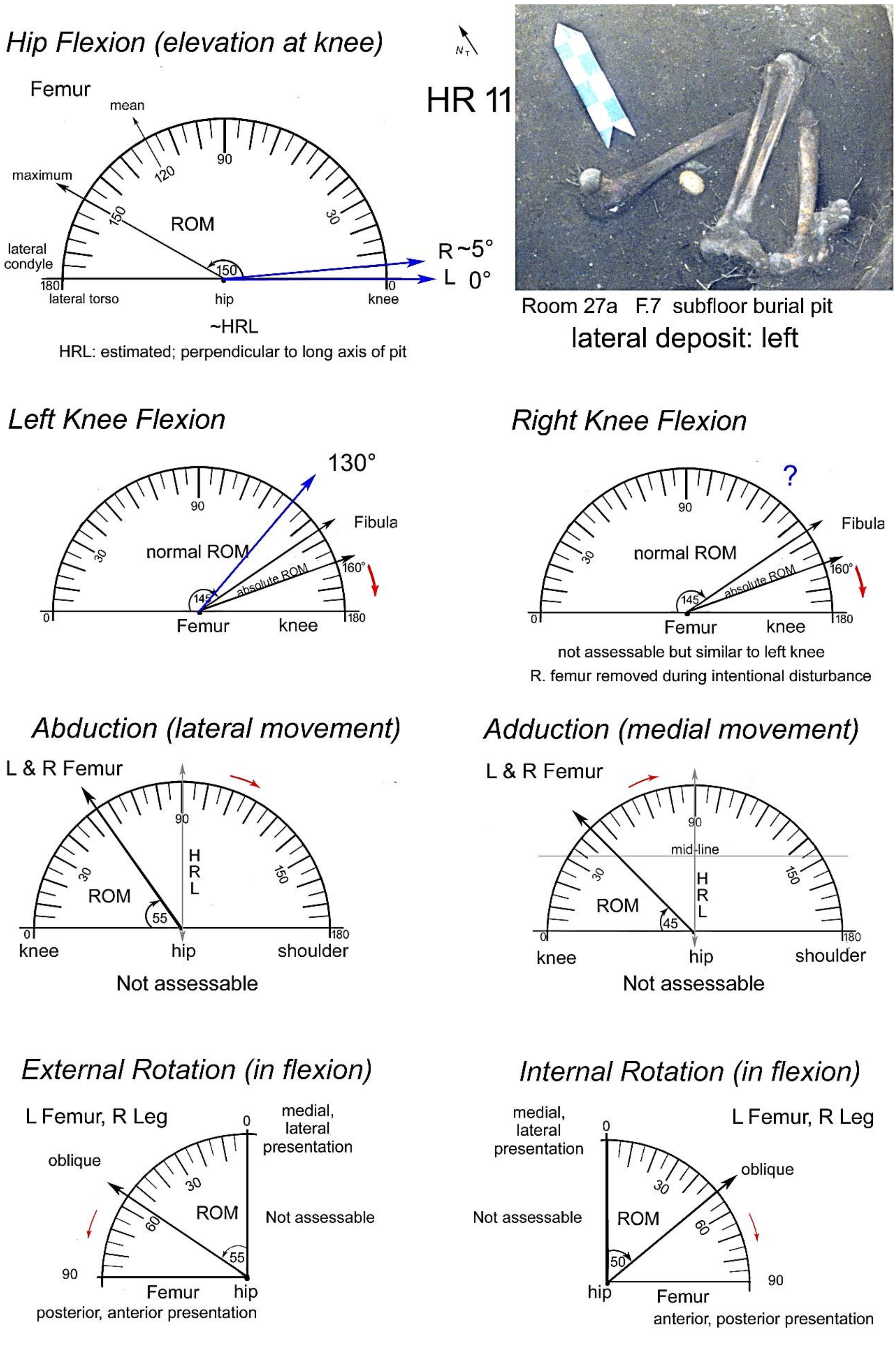
The lower limbs are wedged tightly against the sides of the pit. The left metatarsals and three proximal phalanges are articulated, but the fore-foot has rotated as a unit. Possibly, this represents a change in position from a foot initially held in an elevated position by shrouding.

Evidence for deposition in a void

Indeterminate due to deliberate post-deposit intrusion and disturbance of all bones except the left lower limb and foot and the right leg and foot.

INTERPRETATION

This mature adult male was deposited on the side, with knees semi-flexed, and accompanied by many grave goods, including a possible medicine bag. The upper torso was deliberately disturbed in the prehistoric period, with all bones and artefacts removed. Bones were then re-deposited in a jumbled cluster, along with 21 arrowheads. The interpretation is that the intruders were looking for one or more specific objects, though not the unusual urolith/amulet or other items that may have been visible when the right femur was removed by the intruders.



B.21: Lower limb ROM angles of HR 11.

HR 12

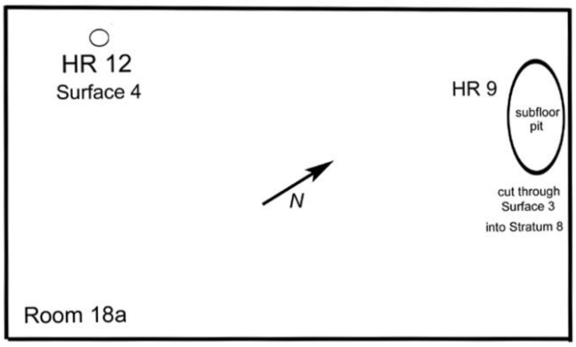


Fig. B. 22: HR 12 Field documentation: Plan of location of bones in SW corner of Room 18a, left; laboratory photograph of bones clustered within a tiny locus.

SUMMARY INFORMATION

***Human Bone Deposit**: Primary Burial*

***Age Group/Estimated Age**:* Late Term Feotus/Neonate

***Sex**:* Unknown

***Location**:* West Arm Annex, Room 18a, southwest quadrant, Surface 4

Chronological Period: Pueblo II, c. AD 1120-1150

Mortuary Context Typ**e**: Surface Room Floor

Accompaniments: none observed

Synopsis

The poorly preserved and scantly represented skeletal remains of a late term foetus or neonate were located during careful trowelling of the original ground-storey floor. There are no long bones. Although no bones were point-located, the approximate extent of the deposit locus was mapped on the Room 18a plan.

Temporal assignment is based on location on the original ground-storey floor and Pueblo II diagnostic artefacts in the overlying stratum.

HR 13

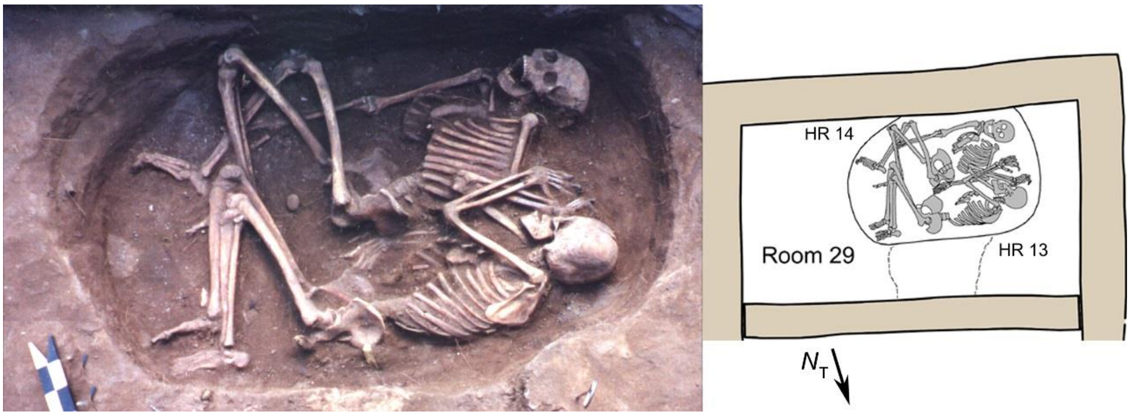


Fig. B.23: HR 13 Field documentation: plan map of HR 13 and 14 the Room 29, Feature 1 subfloor burial pit, left; field photograph of double burial; HR 13, bottom.

SUMMARY INFORMATION

Human Bone Deposit*:* Primary Burial, Double

Age Group/Estimated Age*:* Adolescent (Older); 15 y +/- 3 y, dentition; 15-18 y, skeletal development

Sex*:* Female

Location*:* Room 29, intrusive subfloor pit (Feature 1) cut into a Stratum 3

Chronological Period*:* Pueblo III; Stratum 3 is an organic fill unit containing Mesa Verde B/w sherds; pit fill includes Mesa Verde B/w sherds

Mortuary Context Typ**e**: Surface Room Subfloor

Accompaniments*:* none observed

ANTHROPOLOGIE DE TERRAIN

Synopsis

HR 13 is one of two primary burials that comprise the only certain double burial at Wallace Ruin. They share a large burial pit that extends across much of the floor space of the southernmost room in the Annex. Room size is consistent with a storage room. There are no duplicate articulated anatomic units or isolated skeletal elements within the pit.

All skeletal articulations are in close anatomic position, with only minor displacements from root invasion or burrowing animals. HR 13 was deposited on the right side. The mandible is anatomic position relative to the cranium. The upper limbs project anteriorly and are flexed at the elbows so that the hands are near the face. The right hand presents the palmar surface and the left presents the dorsal surface. The semi-flexed lower limbs project anteriorly at an approximate right angle; the feet are positioned near midline roughly a 20 cm inferior to the isiopubic rami, and against the north pit margin .

Position of skeleton relative to disposal surface

The skeleton rests directly upon the pit base on the right side; the plantar surface of the left foot is in direct contact with the north margin of the pit; the right foot is also in contact with this vertical surface though at an oblique angle. The left scapula and left os coxae are verticalized.

Positions of elements relative to other skeletal regions

The left forearm is in direct contact with the distal shaft of the right humerus and the midshaft of the right forearm. The left lower limb overlies the right lower limb. The configuration of the left versus right rib cages is consistent with disposition of the corpse on the right side. All lower limb angles are within normal Range of Motion (Fig. B. 23)

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, the ordered arrangement of the skeleton.

Labile connections: hands, feet, femur-acetabulum articulation

Persistent connections: Include: shoulders, knees, vertebral column

Evidence for material effect on anatomic position

Burial pit fill has maintained anatomic relationships throughout the skeleton. The left hemi-thorax has collapsed and rotated medially following the emptying of the thoracic and abdominal cavities during decomposition. That the rib spacing and orientation of the sternal ends retain a close anatomic position suggests that the left hemi-thorax collapsed as a unit prior to the decomposition of the intercostal connective tissues, possibly after the slow in-filling of the thoracic cavity. The lateral expansion of the right hemi-thorax and retention of several costovertebral connections is also consistent with slow in-filling of the thoracic cavity for a body covered with fill.

Evidence for deposition in a void: absent

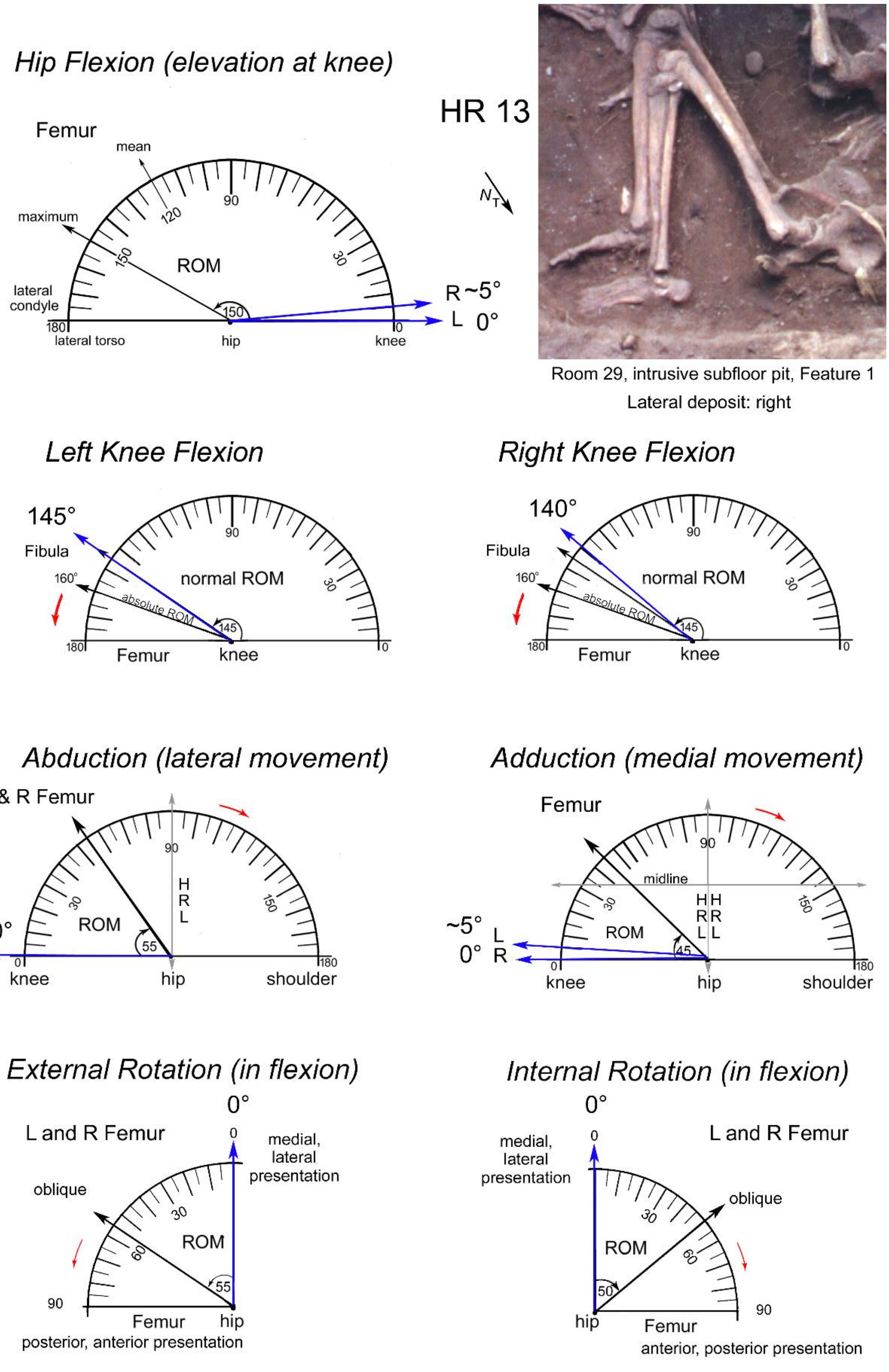


Fig. B.24: Lower limb Range of Motion angles of HR 13.

INTERPRETATION

The maintenance of all anatomic connections, in combination with pit fill attributes, is consistent with deposit upon the base of a subfloor burial pit and the deliberate covering of the body with fill.

HR 14

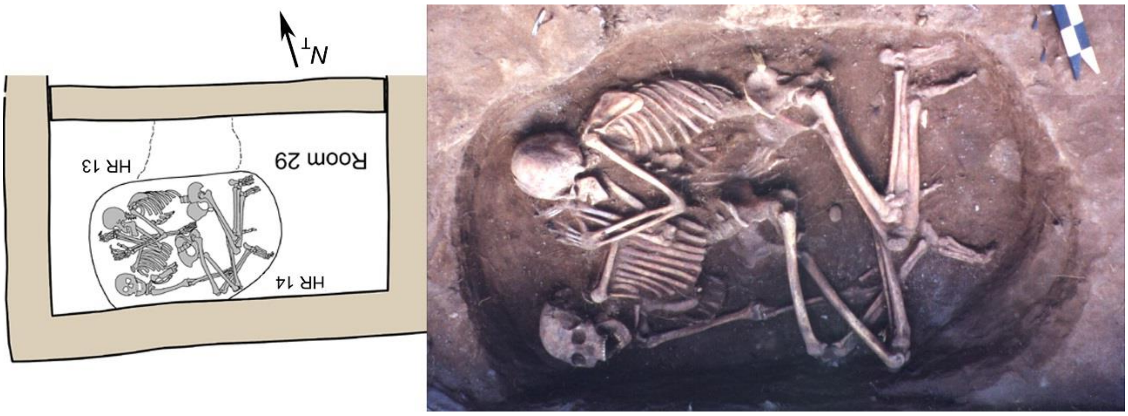


Fig. B.25 HR 14 Field documentation: plan map of HR 14 and 13 the Room 29, Feature 1 subfloor burial pit, left; field photograph of double burial; HR 14, top.

SUMMARY INFORMATION

Human Bone Deposit*:* Primary Burial, Double

Age Group/Estimated Age*:* Adult (Older); skeletal development

Sex*:* Female

Location*:* Room 29, intrusive subfloor pit (Feature 1) cut into a Stratum 3

Chronological Period*:* Pueblo III; Stratum 3 is an organic fill unit containing Mesa Verde B/w sherds; pit fill includes Mesa Verde B/w sherds

Mortuary Context Typ**e**: Surface Room Subfloor

Accompaniments*:* none observed; organic wrapping, inferred

ANTHROPOLOGIE DE TERRAIN

Synopsis

HR 14 is one of two primary burials that comprise the only certain double burial at Wallace Ruin. They share a large burial pit that extends across much of the floor space of the southernmost room in the Annex. Room size is consistent with a storage room. There are no duplicate articulated anatomic units or isolated skeletal elements within the pit.

All skeletal articulations are in close anatomic position, with only minor displacements from root invasion or burrowing animals. HR 14 was deposited on the back, though the torso and flexed lower limbs are angled to the right. The cranium presents anteriorly, with a slight superior tilt. The intact mandible is displaced inferiorly 5 or so cm from the maxillary dentition, beyond anatomic possibility, and angles to the right. The left condyle is in anatomic connection with the mandibular fossa, and the left mandibular angle rests upon cervical vertebrae. The right condyle is displaced posteriorly (downward) and the mandibular angle rests upon the disposal surface. The complete slightly flexed upper left limb is fundamentally extended though slightly bent at the elbow. The shoulder is elevated anteriorly a few cm above the disposal surface. It is also displaced superiorly as well as rotated medially, so in a "hunched" configuration. The arm itself is akimbo, flexed laterally on the torso at about a 40° angle; the distal end rests upon the disposal surface. The elbow rests upon the disposal surface just lateral to left Rib 10, and it is directly overlain (posterior to) the tightly flexed right upper limb of HR 13. The pronated forearm is flexed medially on the arm at a roughly 70° angle and rests upon the disposal surface. The basically extended, palm-down hand is adjacent to the left os coxae on the disposal surface; it is flexed laterally on the forearm at about a 20-25° angle. The right upper limb is extended along the torso; the forearm is pronated and the palmar surface of the hand in direct contact with the disposal surface. The left os coxae is verticalized and presents the lateral surface; the posterior iliac spines rest upon the disposal surface. The dorsal surface of the right os coxae lies flat upon the disposal surface so that the blade presents the ventral (anterior) surface. The semi-flexed lower limbs are intertwined, with both knees pointing laterally to the right. The left femur crosses the proximal end of the right, but the lateral surfaces of the tightly flexed right lower limb rest directly upon the lateral surfaces of the more loosely flexed left lower limb. Specifically, the right fibula midshaft rests directly upon the left fibula midshaft. The feet are positioned 30 to 40 cm inferior to the hips; the left foot presents laterally and is anterior to the body, with flexed toes adjacent to the pit boundary. The right foot presents medially and is about 10 cm posterior to the left, near midline. All limb angles are within normal ROM (Fig. B.25)

Position of skeleton relative to disposal surface

The skeleton rests directly upon the pit base. The posterior cranium, scapulae, and left shoulder, elbow and wrist life flat upon the disposal surface. The left knee is adjacent to the south profile of the burial pit and is slightly elevated above the disposal surface; the left foot sits directly upon the surface. The right humerus is elevated anteriorly a few cm above the disposal surface.

Positions of elements relative to other skeletal regions

The mandible rests upon the anterior surface of either the C-4 vertebra. The intertwining of the lower limbs resulted in the overlay of the left thigh over the right, but the positioning of the right leg over the left.

There is no intertwining of HR 13 and 14 limbs to establish a double burial context with absolute certainty. However, the right elbow of HR 13 lies directly upon the anterior thorax of HR 14, and the right dorsal surfaces of the HR 13 thorax overlies the left forearm of HR 14. Also, HR 13's right knee is in direct contact with the right foot of HR 14.

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, and the ordered arrangement of the skeleton.

Labile connections: hands, feet, femur-acetabulum articulation

Persistent connections: Include: shoulders, elbows, knees, vertebral column

Evidence for material effect on anatomic position

Burial pit fill has maintained anatomic relationships throughout the skeleton except for the dropped mandible. This incongruity suggests that she may have been wrapped in willow mat or feather blanket which provided a barrier to rapid in-filling of overlying sediments in this region of the corpse, thus allowing the mandible to drop during the early stages of decomposition.

Evidence for deposition in a void: absent

INTERPRETATION

The maintenance of all anatomic connections, in combination with pit fill attributes, is consistent with deposit upon the base of a subfloor burial pit and the deliberate covering of the body with fill.

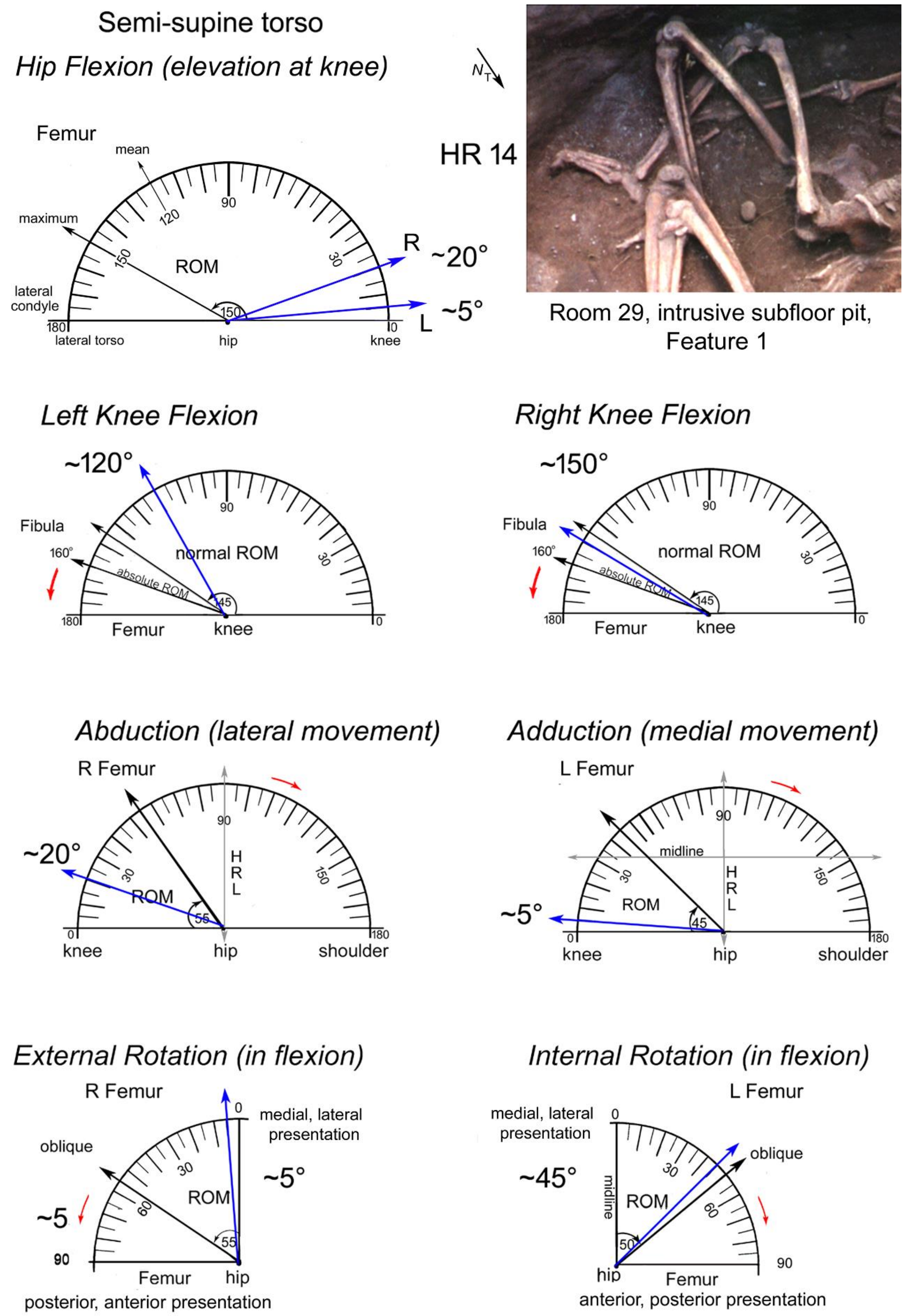


Fig. B. 26: Lower limb Range of Motion angles of HR 14.

HR 15

Fig. B.27: HR 15 mortuary context information: field photograph

SUMMARY INFORMATION

***Human Bone Deposit**:* Primary Burial

***Age Group/Estimated Age**:* Middle Adult (35-50y); pelvic development

***Sex**:* Male

Location: Extramural Midden

***Chronological Period**:* Pueblo II

***Mortuary Context Typ*e**: Extramural Midden

***Accompaniments**:* none observed; Pueblo II sherds within fill

ANTHROPOLOGIE DE TERRAIN

Synopsis

The corpse was interred within the extramural midden; no pit is discernible but the fill within the area is typical mix of ashy fill and cultural rubbish. The skeleton is supine; knees project upwards at an approximate 45 degree angle, with legs flexed tightly under thighs and feet adjacent to buttocks.

Position of skeleton relative to disposal surface: within midden fill

***Positions of elements relative to other skeletal regions**: legs under thighs*

***Evidence for a primary burial deposit**:* Designation as a primary burial is based upon the presence of intact labile connections, persistent anatomic connections, and the ordered arrangement of the skeleton.

Labile connections: hands, feet; femur-acetabulum joint

Persistent connections: Include: vertebral column; knees, elbows

Evidence for deposition in a void*: none*

Evidence for material effect on anatomic position*: Bones held in close anatomic position by overlying fill.*

INTERPRETATION

Interment in midden fill. Supine, but knees angled towards feet with legs flexed tightly under thighs. All lower limb angles are within normal ROM. Knee hyperflexion is perhaps abnormal, but retrospective analysis conditions preclude a confident diagnosis of abnormal ROM.

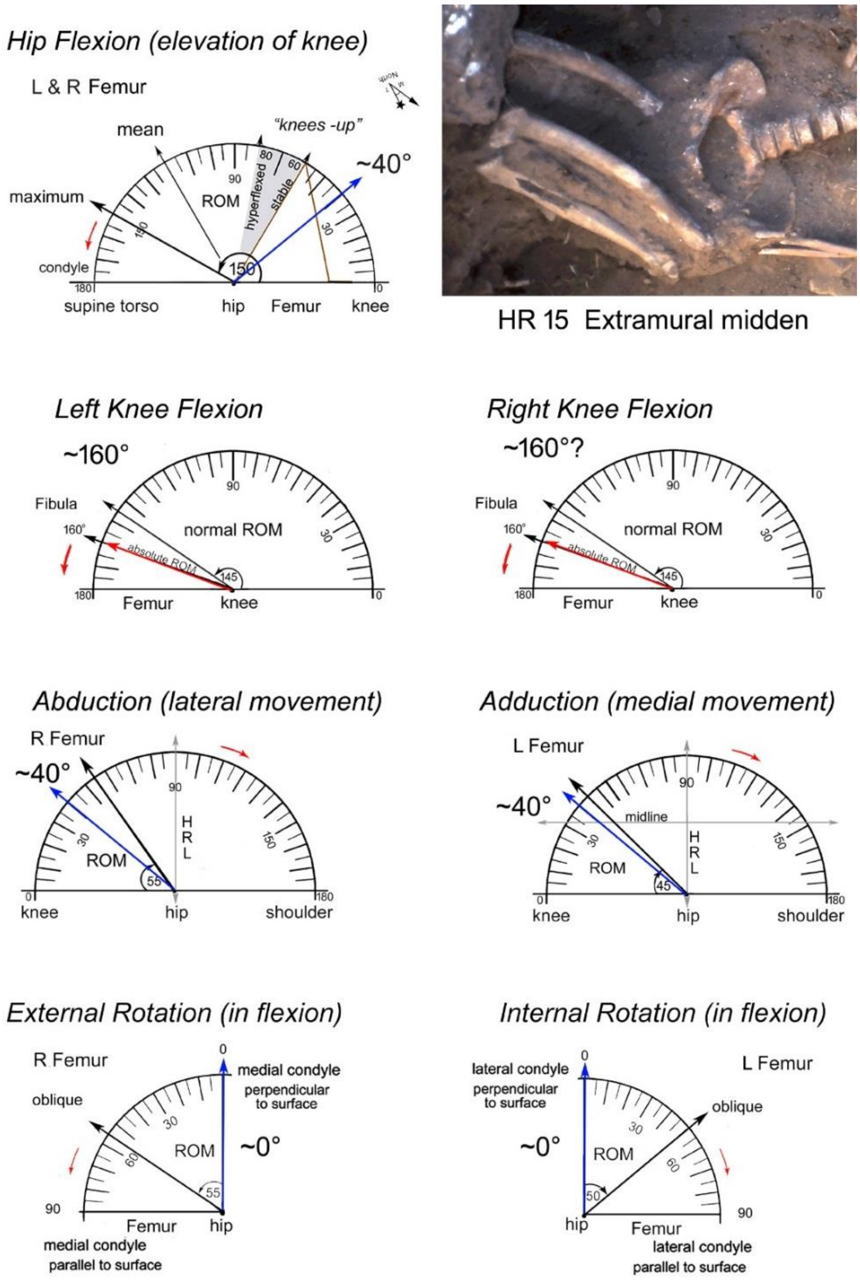


Fig. B.28 Estimated ROM measurements for HR 15.

HR 17

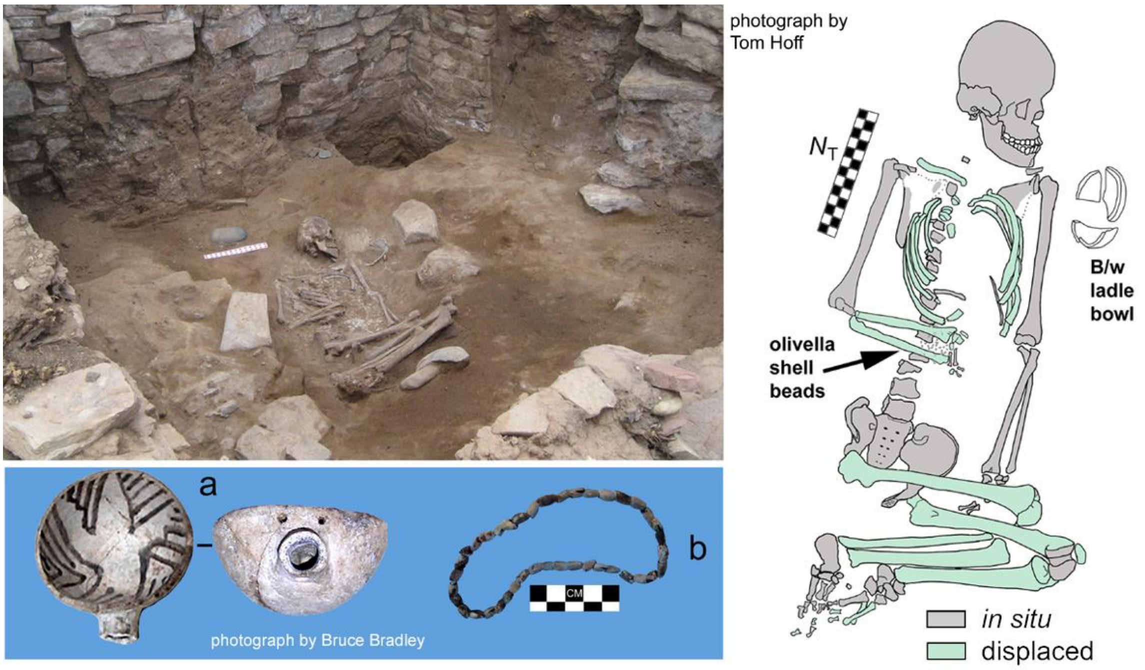


Fig. B.29: HR 17 mortuary context documentation: field photograph, top, photograph by Tom Hoff; mortuary context plan, right; a) McElmo Black-on-white ladle; b) olivella shell bracelet.

SUMMARY INFORMATION

***Human Bone Deposit**:* Primary Burial

***Age Group/Estimated Age**:* Adolescent (Older); 15±3 y, dentition, 15-18 skeletal development

***Sex**:* Probably female

***Location**:* West Arm Annex, Room 30a, central, upper contact of Stratum 3

Chronological Period: Pueblo III, AD 1180-1280; Mesa Verde Black-on-white sherds within underlying Stratum 3

***Mortuary Context Typ*e**: Surface Room Floor

Accompaniments: McElmo Black-on-white ladle, olivella shell bracelet with 40 beads had been wrapped around right wrist (string deteriorated)

ANTHROPOLOGIE DE TERRAIN

Synopsis

This adolescent skeleton is well-represented and bones are primarily *in situ*. Bone structures are largely intact, including articular surfaces, but surface preservation is often poor owing to adverse preservation conditions within alkaline sediments. The disposal surface is the upper contact zone of natural sedimentary fill that includes some wall stones and a scatter of pot sherds. It is uneven and slightly concave, so that the supine torso is at a lower elevation than the upper limbs. The intact cranium and articulated mandible rest directly upon the disposal surface, both present the right surface surface. Most of the cervical vertebrae are missing or fragmentary, but the occipito-C1 articulation is assessable. There is a minor increase in joint space, indicating that either the cranium/mandible or the vertebral unit comprising C1 and C2 is not *in situ*. The displacement is minor, and without C3-C4 (post-disposal deterioration), it is uncertain whether the cranium/mandible or the articulated C1-C2 unit has rotated from anatomic position. There is a good possibility is that this unit has dropped onto to the surface since other skeletal evidence is consistent with deposit in a void. The bones of the superior torso and the upper limbs are in anatomic position. The inferiorly tilted ribs lie flat upon the disposal surface. The left limb is extended along the side of the torso. The hand and wrist bones are in close anatomic position. The metacarpals present lateral surfaces consistent with a "thumb up" orientation. The wrist and forehand are underneath, but not in direct contact with, the right femur. The phalanges are directly underneath the midshaft of the left femur. The right forearm is flexed across the abdomen at an approximate right angle. The right hand is flexed on the forearm at a near right angle but at a lower elevation than the incompletely fused distal epiphysis of the right radius. The sacrum lies flat upon the disposal surface and presents anteriorly. It is in close anatomic position in relation to both the 5th lumbar vertebra and the left os coxae. The left os coxae presents the anterior surface; the iliac blade is flat upon the disposal surface and the pubic symphysis projects upwards. The right os coxae is in close anatomic position relative to the sacrum. The iliac blade is almost vertical, with a slight medio-posterior tilt. The lower limbs are tightly flexed to the left, with all long bones roughly parallel, and rest directly upon the disposal surface. There is a definite upwards incline from hip to knee due to the concave curvature of the deposition surface, so that the knees are 5-6 cm higher in elevation. The femoral heads articulate with the ossa coxae, but both femora are rotated at angles not possible in a living person; all leg bones are displaced from anatomic position. The right tibia and fibula are parallel and are bordered superiorly by the left femur and inferiorly by the left tibia. The feet are positioned near midline, about a foot-length inferior to the hip bones.

Position of skeleton relative to disposal surface

The scapulae are flat upon the deposit surface, as are the sacrum and left os coxae. Both shoulders and elbows and the right wrist are in direct contact with the disposal surface. The undisturbed section of the vertebral column is in a natural anatomic alignment. These *in situ* vertebrae rest directly upon the disposal surface; those assessable in field photographs present the left anterolateral surface. All are either in articulation with or in close anatomic position to adjacent vertebrae. The femoral condyles are in direct contact with the disposal surface, as are the ankles.

Positions of elements relative to other skeletal regions

The left forearm rests upon the left hemi-thorax. The left femur midshaft rests directly upon the right iliac blade. The distal end of the right femur and the midshaft of the left femur rest upon or just above the left hand; it is not possible to determine if there is any soil between these elements from photographs and this information was not recorded in the field.

Evidence for a primary burial deposit

Designation as a primary burial is based upon the presence of intact labile connections, some persistent anatomic connections, the ordered arrangement of the skeleton and the presence of grave goods.

Labile connections: femur-acetabulum; hands; feet

Persistent connections: Include: shoulders; lumbar vertebrae; left elbow, left os coxae and sacrum

Evidence for material effect on anatomic position

Neither shoulder is hunched or positioned tightly against the ribs. The incomplete left clavicle is in anatomic position. The right clavicle is horizontal and in close anatomic position, however, it is rotated superiorly (90 degrees) so that it presents the inferior surface. The natural destruction of both ends of the left clavicle and the superior rotation of the right clavicle suggest movement by roots rather than shrouding. The non-anatomic flexure of the right hand may suggest positional distortion owing to the somewhat concave disposal surface.

Evidence for deposition in a void

Increased joint space within the right elbow: The forearm has shifted into a deeper region of the basin and is displaced inferiorly, medially and posteriorly; the midshaft of the forearm rests upon thoracic vertebrae. The right radius head is in close anatomic position to the trochlea, rather than the capitulum, of the humerus.

Increased joint space within the right wrist: the distal end of the radius is displaced superiorly about 2-3 cm from that of the ulna.

Increased joint space within both knees.

Flattening of the left os coxae

All lower limb ROM angles are beyond anatomic possibility. Internal/external femoral rotations are 170° compared to normal 55° and 50° (Fig. B.29).

INTERPRETATION

The non-anatomic displacements of the right elbow could be attributed to rodents, however the ROM measurements of the lower limbs, and the positioning of the feet relative to the hips, are consistent with the collapse of semi-flexed lower limbs in an upright knees postural arrangement onto the disposal surface during corpse decomposition. The slight curvature of the basin seems to have provided a particularly unstable base for the feet, which accounts for the significant rotations of the femora, even though both head-acetabulum connections were maintained. These non-anatomic movements, in which all limb bones are directly upon the disposal surface, can only occur with decomposition in an open space.

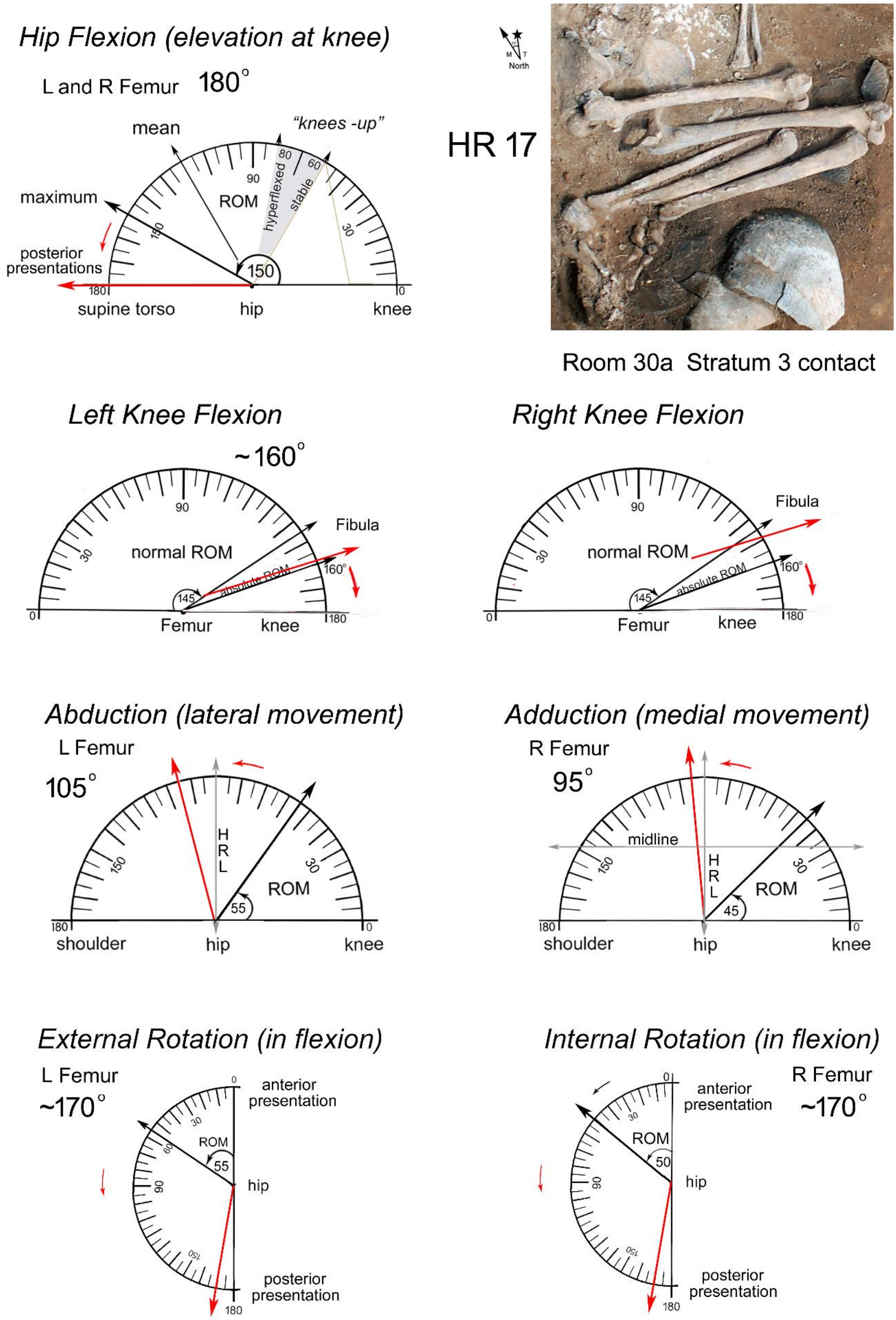


Fig. B.30: Lower limb ROM angle measurements.

APPENDIX C

Osteobiographies of Pueblo III Primary Burials and iLinks from Wallace Ruin

Table C.1: List of paleopathological abbreviations.

CAR	infectious caries	CR	completely remodelled/healed
DEH	dental enamel hypoplasia	MX	mixed reaction/healing
EP	ectocranial porosis	AC	active/no healing
PR	periosteal reaction	SL	slight
STN	stunting	MD	moderate
AmF	ante-mortem fracture	SV	severe
PrF	peri-mortem fracture	P	present
CRA	cranial	A	absent
I-CRA	infra-cranial	UN	unknown/not assessable

Table C.2: The occurrence of skeletal indicators of stress in the P3WR14 subgroup comprised of individuals with both cranial and infra-cranial elements. This distribution includes localised and systemic reactions.

Indiv.	Age Group	Sex	(P)EH	EP	FRAC	PR	ORAL	STN
HR 2	I	U	U	P	A	P	A	A
HR 3	AO	M	P	P	AmF	P	P	A
HR 4	MA	M	U	U	A	A	U	A
HR 5	AO	F	A	P	A	P	P	A
HR 6	C	U	P	P	AmF	P	A	A
HR 10	AO	F	A	P	AmF	A	A	A
HR 11	MA	M	P	P	AmF/PrF	A	P	A
HR 13	AO	F	P	P	A	U	A	A
HR 14	OA	F	P	A	A	A	A	A
HR 17	AO	PF	P	P	AmF	A	P	A
LNK 324	AO	F	U	P	A	P	P	A
LNK 835	C	U	U	P	A	P	A	A
LNK 836	C	U	U	P	A	P	A	A
LNK 867	YA	F	P	P	A	P	A	A

HR 2

Individual Profile: HR 2

Observability	
Skeletal representation	nearly complete
Bone condition	good
Surface preservation	good
Demography	
Age	9 ± 3 m, dentition; 9-12 m, skeletal: hypoglossal canal
Sex	undetermined due to age
Paleopathology	
Enamel hypoplasia (d)	absent
Dental caries	absent
Ectocranial porosis	orbits: CR/SL; vault: CR/SL-MD/MX
Periosteal response	2 endocranial lesions, SL/CR, MX
Stunting	absent (FEM length: 105 mm)
Fracture/type	absent
Other	developmental remodelling of alveolar margins
Broad Category	nutritional deficiency
Differential Diagnosis	

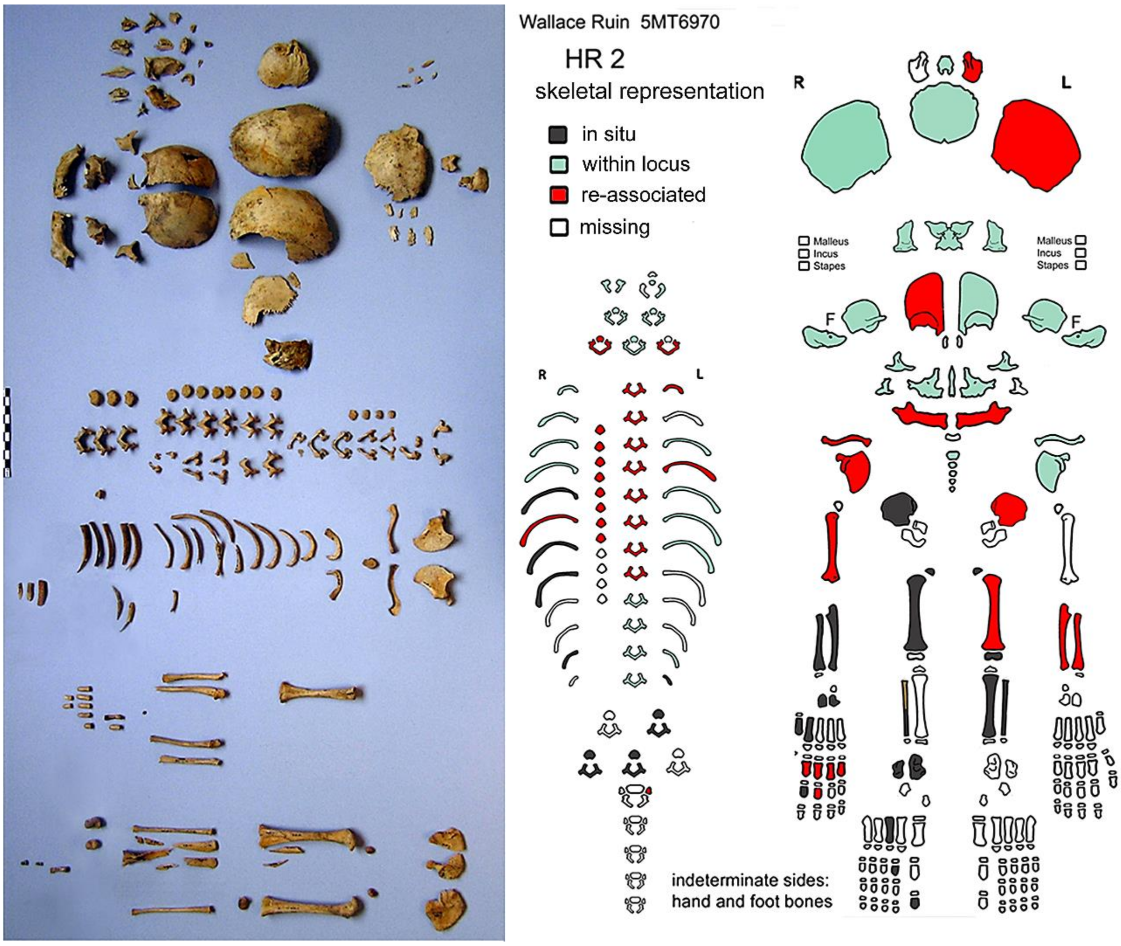


Fig. C.1: Photograph and schematic representation of HR 2 skeletal elements.

Paleopathology Summary

Most of the bones from this young infant are intact, apart from minor dry-bone damage. Surface preservation is also generally very good, allowing high confidence in observability accuracy regarding all six stress indicators. The two observed skeletal pathologies consist of ectocranial porosity and periosteal responses. Porotic lesions (EP) affect each frontal orbit, both parietals and the occipital squamous (Fig. C.2, upper). The frontal squamous, temporal and sphenoid bones are unaffected. All orbital and parietal lesions are completely healed and slight in expression. Larger regions (3-4 cm) of porosity affect both the left and right superior margins of the occipital squamous. Pore size ranges from pin-point to 2 mm diameters. Several of the larger pores have sharp edges but the vast majority have the blunt, rounded edges that are indicative of healing. Based on the most severe expression, EP is classed as a mixed reaction of moderate severity. Bone tissue having a porous appearance is observable across most of external surfaces of the unfused maxillae. Most of the lesions intrude into cortical bone but some of those adjacent to the alveolar margins may be appositional. The appearance of the tissue adjacent to the infraorbital foramen is normal. While these pores/deposits could be suggestive of a scorbutic response, there is a strong possibility this manifestation is instead related to normal bone turnover during rapid growth in an infant who was concurrently undergoing the eruption of several teeth.

The midsections of the long bone shafts are free of periosteal reactions, but two small patches (<1 cm) of appositional bone are on the endocranial surface of the occipital squamous in the region of the cruciate eminence (Fig C.2, lower). The superior deposit is incompletely remodelled whereas the lamellar reaction of the other indicates advanced healing. Lewis (2004:94) reports that such lesions can represent a non-pathological condition in which new bone is laid down in proximity to this structure by osteogenic dura during the rapid growth that takes place in the first six months of life. However, if HR 2 is about one year of age, then the incompletely remodelled lesion may represent a pathological response.

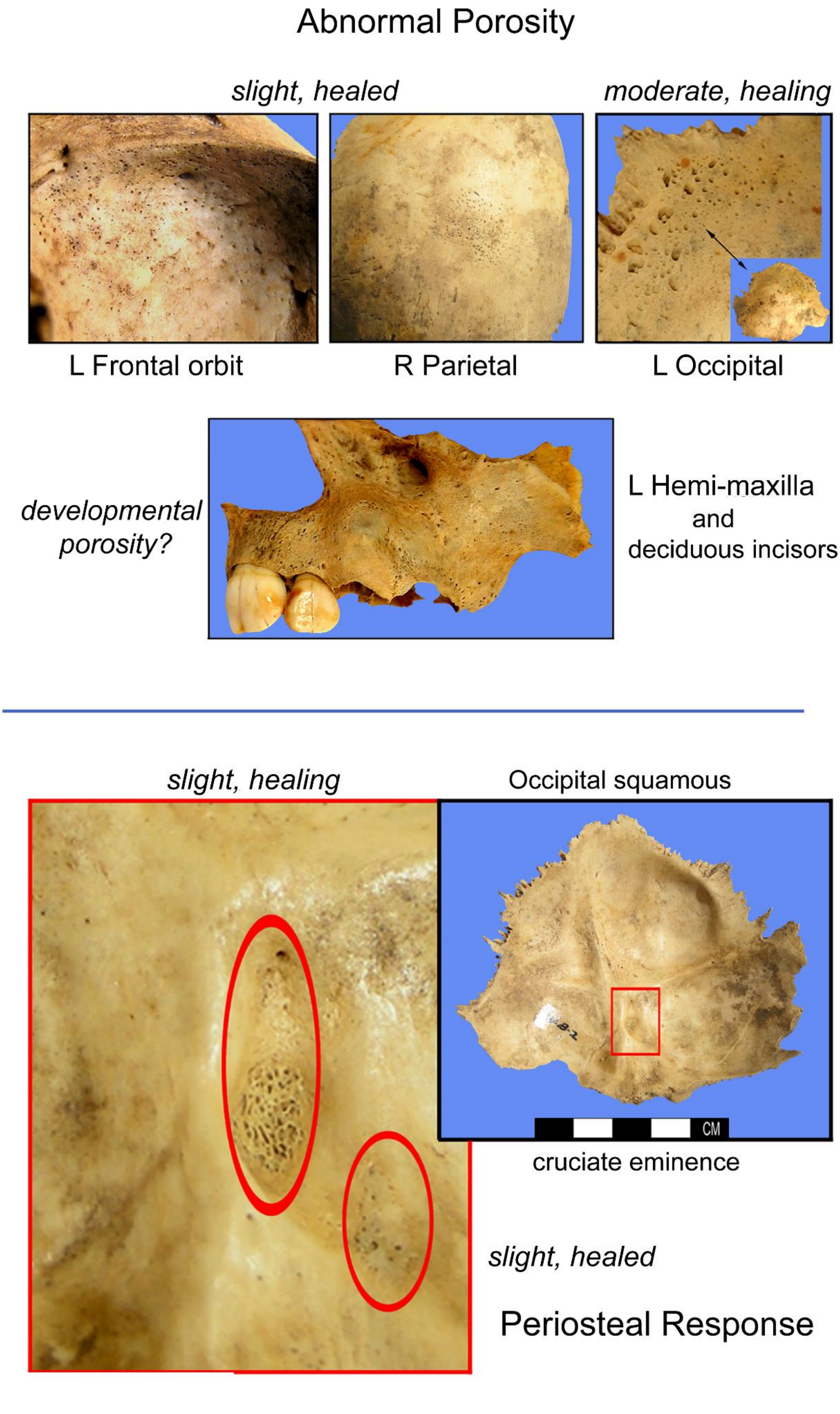


Figure C.2: Photographs of pathological conditions in HR 2 bones.

To summarise, the comparatively slight appearance of the EP and PR lesions, and their largely healed status, suggest that this 9-12 month-old experienced one bout of mild to moderate nutritional stress from which he or she was recovering at the time of death. However, although an underlying nutritional deficiency may have prevented the achievement of optimal longitudinal growth, it was not sufficiently severe to affect this infant unduly in relation to same-aged Ancestral Pueblo infants. One or both of the endocranial periosteal lesions could represent a response to a limited, localised inflammatory response rather than a developmental condition. However, the absence of lesions on the endocranial surfaces of the parietal and temporal bones suggest that there was no associated bleeding of the meninges arising from meningitis or scurvy. The absence of periosteal lesions of the long bones or bones of the torso points to a rapid death from an acute condition that was possibly exacerbated by an underlying nutritional deficiency.

HR 3

Individual Profile: HR 3	
Observability	
Skeletal representation	essentially complete
Bone condition	excellent
Surface preservation	excellent
Demography	
Age	15 ± 3 y, dentition; 15-18 y, epiphyseal union
Sex	male: pelvic morphology and dimensions; FEM head (43 mm)
Paleopathology	
Enamel hypoplasia (P)	systemic; 5/7 anterior teeth; 2.5-3.0 and 3.0-3.5 y
Dental caries	2: interproximal, small, maxillary
Ectocranial porosis	orbits and vault: CR/SL
Periosteal response	localised, secondary to trauma; maxilla body: CR/SV; palatine process: MX/SV
Stunting	absent (FEM length: 42.1 cm); partial union, d. epiphysis
Fracture/type	ante-mortem: mid-face Plane III; lateral luxation: CR/SV
Other	periodontal abscess: maxillary R (L?) central incisor
Broad Category	nutritional deficiency
Differential Diagnosis	bacterial infection secondary to trauma

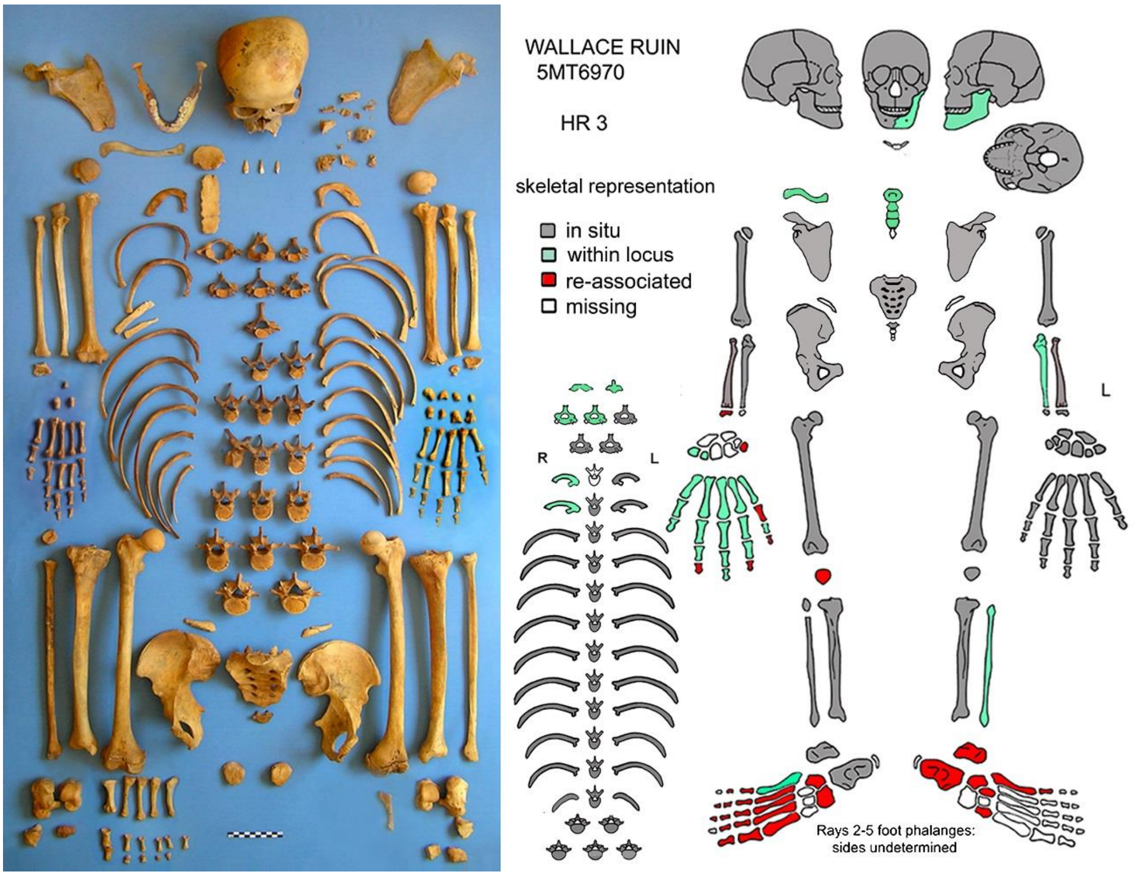


Figure C.3: Photograph and visual inventory of HR 3 skeletal elements.

The older adolescent male HR 3 is represented by a nearly complete skeleton (Fig. C.3). The large majority of the bones are intact apart from minor dry-bone damage produced during wall collapse. The excellent preservation of bone surfaces allows a high degree of confidence in observational accuracy.

Paleopathology Summary

A skeletal response is observed in five of the six observable stress indicators. Ectocranial porosity, enamel hypoplasia, and dental caries are mild in expression, whereas the ante-mortem trauma and a localised periosteal response secondary to fracture are classed as severe. Only 5 of 23 teeth have enamel defects. A systemic stress disrupted enamel formation in five anterior teeth between 2.5 to 3.0 years of age, then a second period between 3.0 to 3.5 years affected four of these same teeth. The latter episode is the peak age-at-stress in Ancestral Pueblo children (Malville, 1997). Two large inter-proximal cavities at the cemento-enamel junction of the maxillary right central incisor and right canine are unlikely to be the source of bacterial infection since neither intrudes beyond the dentine or into the pulp cavity (Fig. C.4). Crown damage and dark roots are probable sequeala to mid-face trauma. Ectocranial porosity occurs as slight, healed lesions within each orbit and on the superior calvarium near bregma (Fig. C.4b). Observation of diploic thickness is not possible in this intact cranium. Finally, the maximum length of the incompletely mature femur indicates that HR 3 is not stunted compared to males from the Point of Pines reference group (Bennett, 1973). It seems that HR 3 experienced low levels of skeletal stress for most of his young life. Even though he may not have yet attained final stature, femoral length, mild EP and the absence of systemic PR in the long bones or other post-cranial elements suggests that any nutritional or systemic infectious stresses that he survived would have been of mild to moderate intensity.

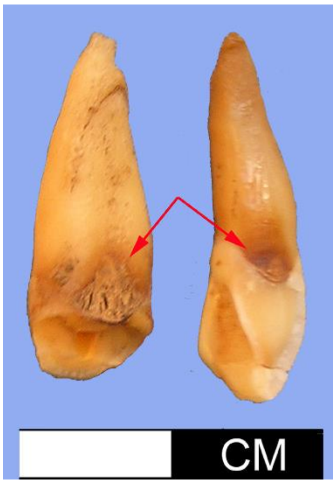


Fig. C.4: Non-invasive caries and possible dark roots to dead maxillary teeth; right canine, left and right central incisor, right. Canine crown damage is probably antemortem; central incisor enamel loss is recent but other damage may be ante-mortem.

Fig. C.5: Slight, healed EP and non-invasive caries in HR 3 skeletal remains.

In marked contrast, ante-mortem trauma to the mid-face is severe both in terms of fracture characteristics and probable sequelae (Mathog et al, 1995). The damage is consistent with injuries sustained during a single event involving high-velocity, blunt-force trauma from the front. This “head-on” injury extends from the nasofrontal suture to the alveolar region of the maxilla (Fig. C.6); external effects include changes in the shape of the nasal aperture whereas an observable internal effect involves a deviated septum. Other skeletal responses include: fracture of the left inferior orbital margin in concert with inferior displacement of the left infraorbital rim comminuted fractures of the nasomaxillary region, in changes in the shape and configuration of the nasal sutures, and “telescoping” depression of the nasal dorsum into the ethmoid; fractures of the nasal spine and both maxillary alveolar ridges, loss of alveolar marginal bone and destruction of the anterior alveolar walls; and, minor splitting of the midline suture of the palatine process and lateral displacement of the incisive fossa. Even so, all fractures are healed and the lacrimal and zygomatic bones are unaffected.

Antemortem Fracture: Plane III Mid-face

The comminuted fractures of the naso-maxillary region consist of one or two simple linear fractures of each nasal bone and in both superior maxillary processes. The superior and inferior sections of, what should be the open, internasal suture is completely covered with compact bone, and although the central region of the nasal suture is still visible, this area also contains deposits of sclerotic bone. The configurations of the nasomaxillary sutures are irregular and, especially in the case of the right nasal, exceptionally sinuous. Moreover, the inferior quarter of the right nasal is missing, but this is not due to post-mortem loss since the undulating inferior margin has remodelled bone. Each superior process has linear fractures of the anterior surface and along its lateral margin. A vestigial fracture line is observable along the superior half of the margin of the right nasal aperture. No such line is visible on the left margin of the nasal aperture. A short linear fracture extends from the inferior margin of the left orbit to the maxillary foramen.

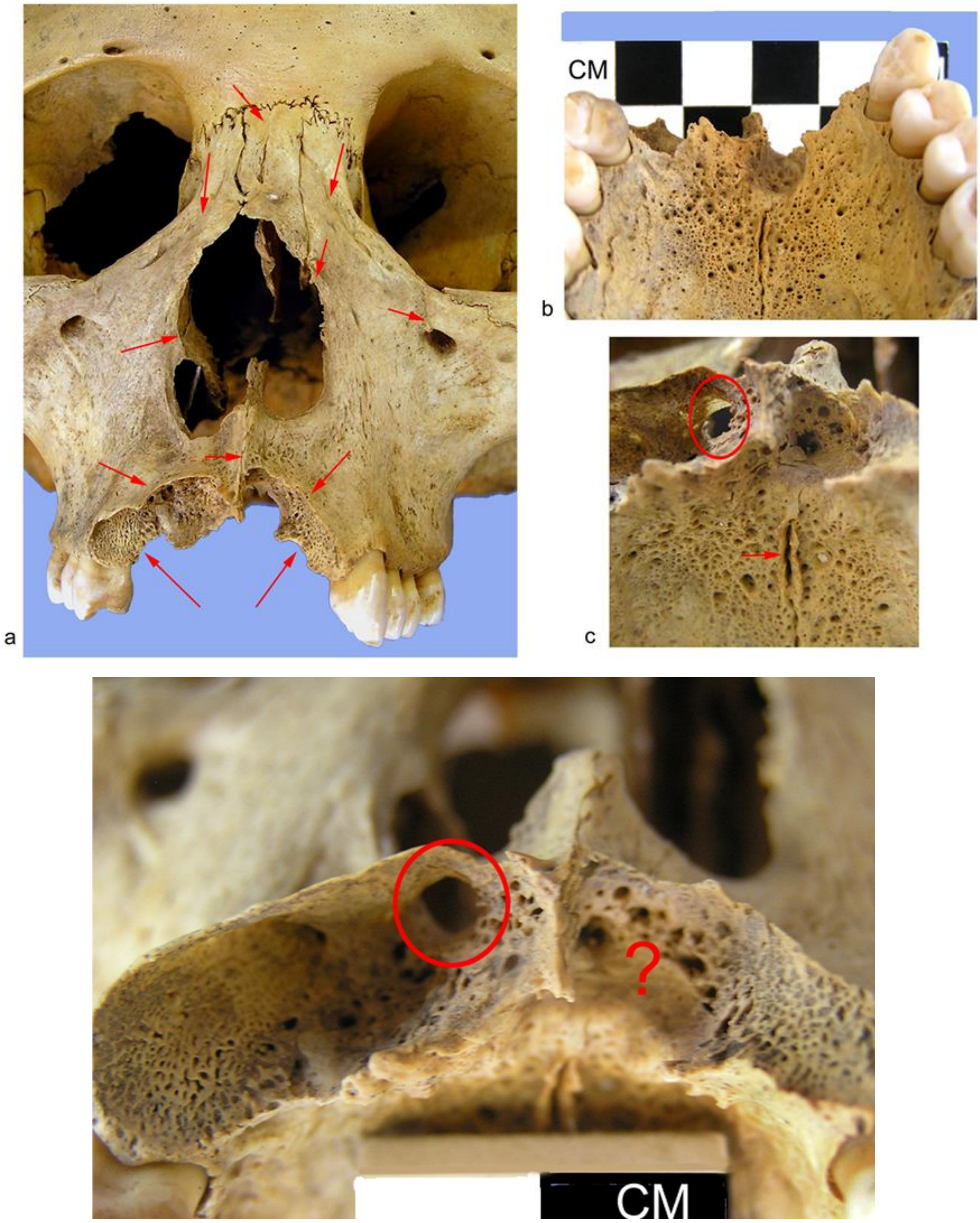


Fig. C.6: Photographs of the severe but healed mid-face damage of HR 3; including healed fractures (red arrows); lateral luxation of the anterior maxilla; chronic periosteal response (b) and healing sequelae are highlighted in red; d) one confirmed abscess (circled) at the base of the right central incisor root, and loss of interdental septa. Possible abscess of left central incisor root.

The damage to the maxillary and palatal margins of the anterior alveolar region of the maxilla is also extensive and severe. The alveolar rim is missing from the lateral border of the socket for the left lateral incisor to the lateral border of the right canine socket, though the anterior surface is the more affected. However, this bone loss is not due to post-mortem damage since the smooth, rounded edges of the fracture margins evidence remodelling.

This powerful blow displaced the nasal spine posteriorly and the incisive foramen to the left. The current position of this foramen allows for a slight posterior displacement, however, the inability to evaluate its position relative to the undamaged configuration of the anterior alveolar margin makes this determination uncertain. The incisive foramen appears to be abnormally shallow, but whether this is developmental or a product of the damage is unknown. The incisive suture is barely discernible due to the adjacent fracture damage to its right and the overlying periosteal response. However, the position of this depression in relation to the incisive suture suggests that it is an anatomic feature rather than an abscess; moreover, the appearance of the bone surface within this depression is compact compared to the adjacent periosteal lesions. The loss of the alveolar rim of the palatine process eliminated the bony structure between the fossa and the left central incisor tooth socket, however, these structures sit in different horizontal planes and there are no connecting channels. The incisive canals (foramina of Stenson) through which the descending palatine vessels and nasopalatine nerves transmit are no longer visible using 10x magnification. Even if some residual capacity remained, this neurovascular network would have been severely compromised. Judging from the vertical appearance of the periosteal response at mid-line, this impact also appears to have produced a slight separation of the mid-line suture. The entire hard palate is overlain with at least one sheath of abnormal bone deposition, so any remnant fracture lines are unobservable, if present, and radiography is not an option. However, there are no undulating ridges lying perpendicular to the anterior arch.

The interdental septa (alveolar walls) for the four maxillary incisors and the medial margin of the right canine are completely destroyed, although a remnant of the thicker, fused interdental tissue at midline remains. No anterior maxillary teeth were in-socket by the time of excavation. However, the left lateral incisor, right central incisor and right canine, were recovered in close vicinity during excavation. The presence of these teeth thus indicates that the blow to the face did not result in the immediate loss of all of the anterior teeth. The crown of the left lateral incisor is intact, and the loss of some the right canine enamel has the appearance of post-mortem damage. However, the superior crown of the right central incisor has two step fractures, plus there is a lesion of the root on the labial surface near the cement-enamel junction. The dentin and enamel exposed in the fracture closest to the occlusal surface has the very sharp-edged and white appearance of a recent, possibly post-excavation, fracture. The darker dentin exposed in the sharp-edged fracture nearer to CEJ may be secondary dentin that developed during life, or, its appearance may be related to soil exposure in a depositional environment (diagenesis). A small imperfection on the anterior surface of the right canine superior to CEJ is not classified as a carious lesion since there is strong possibility that it represents damage incurred from the blow that fractured the canine crown.

Judging from these multiple lines of evidence, the probable explanation for the damage to the alveolar region of the maxilla involves the significant lateral luxation of the maxillary incisors and right canine. Specifically, the head-on blow was sufficiently forceful to push the tooth crowns lingually (posteriorly) and, consequently, project the apex of the tooth roots labially (anteriorly) through the facial alveolar wall (Andreasen and Andreasen, 2007:419). This action simultaneously fractured the thin, fragile palatal and maxillary bone margins in the process. The greater damage to the anterior maxillary margin is consistent with such a process (Ibid., Fig. 15.2). Unless corrected by advanced surgical procedures, the disruption of the superior alveolar nerves and the inferior alveolar artery will result in non-vital, or dead teeth. It seems that at least three teeth were held in place by soft tissues. However, it is improbable that they were returned to the anatomic position required for the maintenance of tooth vitality since the repositioning of just a single tooth may require advanced medical procedures (Ibid., 412). Change in tooth colour is a frequent occurrence in luxation injuries (Flores et al., 2007). However, the root of the central incisor is somewhat darker than the other two roots, which may indicate the onset of a necrotic pulp (Schurrs, 2013). Given the certainty of damage to their neurovascular network, the probability is that all three teeth were non-vital by the time of death.

Various lines of evidence indicate that the mandible was not damaged during this incident. The complete fracture of the mandible at midline has the irregular, dry-bone characteristics of post-mortem damage. Both central incisors are missing, whereas the remaining anterior teeth are present in crypt. It is unknown if the central incisor crowns were damaged in this incident, but the absence of reactive bone in each socket indicates that both teeth were lost post-mortem. The lateral incisors are undamaged, and the fractures of the canines have the sharp, white edges that are more consistent with post-mortem, and possibly post-excavation, damage.

A periodontal abscess is most often associated with inflammation of gingival tissue; however, it can also result from a localised trauma. Such lesions consist of collections of pus (bacteria) that form within the bony structures of the jaw. Either, or both, circumstances could explain the recurrent episodes of PR responses in the palatal process.

The right central incisor root would have been adjacent to an abscess that completely penetrates alveolar bone and forms a channel that connects the interdental region and the nasal cavity. The root surface and tip appear normal; the root is slightly darker than the roots of the other two loose teeth, but whether this indicates a loss of vitality due to the disruption of the vascular network or differential diagenesis is unknown. Assuming so, this lesion is interpreted as an abscess of the periodontal pocket secondary to trauma rather than a periapical abscess arising from bacterial infection of the tooth pulp (Hillson, 2001; Laskaris, 2003:57). A periodontal abscess is most often associated with inflammation of gingival tissue; however, it can also result from a localised trauma. Such lesions consist of collections of pus (bacteria) that form within the bony structures of the jaw. Either, or both, circumstances could explain the recurrent episodes of PR responses in the palatal process.

The damage in the nasal-ethmoid-orbital region is consistent with severe, Plane III mid-face trauma, which Meleca and Mathog (1995:73) define as “bilateral, comminuted, and displaced medial orbital wall fractures.” The damage of the alveolar region of the maxilla is characteristic of a lateral luxation fracture involving all four maxillary incisors and the right canine. This condition entails a blow sufficiently forceful to push the tooth crowns lingually (posteriorly) and, consequently, project the apex of the tooth roots labially (anteriorly) through the facial alveolar wall (Andreasen and Andreasen, 2007:419). Although several anterior teeth were retained (Fig. C.3), there is a strong probability that they were non-vital, or "dead teeth" since the return of luxated teeth to anatomic position requires surgical intervention (Flores et al., 2007). The involvement of multiple teeth is indicative of a particularly significant blow versus one involving a single tooth (Ibid). Such a forceful impact also would explain the slight sutural separation of the midline suture.

Otherwise, the cranium has no depression fractures, abrasions or cuts, and the post-cranial bones are entirely clear of such wounds; these include those bones of the arms and hands that commonly incur defensive wounds (Judd, 2008). There is no peri-mortem damage. The appraisal of possible causes of injury is addressed in the intra-population analysis of patterns of skeletal trauma in the P3WR remains.

Those within the central palatine process have the porous appearance that occurs in more advanced stage of remodelling. The presence of at least two layers of lamellar deposits containing bone in different stages of healing suggests a chronic condition that was ongoing at the time of death. The maxillary sinuses are unobservable, but the orbits and frontal bone are clear of PR. These deposits are judged as a localised response secondary to the significant damage to the mid-face. Although only skeletal tissue is now observable, Plane III fractures of the naso-orbital region are associated with significant soft tissue swelling and bleeding (Latoni et al., 1995). Since nasal fractures commonly produce "black eyes," it is possible that at least some of the healed orbital lesions represent an inflammatory response to haemorrhage. Discrimination of marrow expansion versus an inflammatory response to haemorrhage is not possible without light microscopy, especially when orbital bone is well-healed (Schultz, 2003; Schultz et al., 2007). In addition, luxation of the anterior teeth provides a second source of haemorrhage as the periodontal ligaments and the neurovascular supply to the tooth pulp are severed (Andreasen and Andreasen, 2007:411). In combination with the direct blunt trauma to the labial surface of the upper lip, the anterior projection of the root tips and fracture edges of the alveolar rims produces simultaneous abrasion and bruising of the gingiva and the lip's lingual tissues.

Although such soft tissue injuries probably involved some measure of an inflammatory subperiosteal response to haemorrhage, this damage doubtless also enabled the introduction of bacteria though open wounds (Hutchison, 1997:442). However, since the vascular system of facial tissues is quite vigorous, healing tends to proceed quickly (Latoni et. al, 1995); this vascularity also reduces the risk of bacterial infection compared to other regions of the body (Kretlow et al., 2010). This anatomical circumstance may explain the difference in the appearance of PR lesions of the maxillary body versus the less-richly supplied palatal process.

Potentially, the chronic, layered and healing state of the palatal lesions is associated with a periodontal abscess located in the region of the socket for the right central maxillary incisor. The smooth, rounded edges and absence of woven bone are consistent with advanced healing. A smaller defect at the apex of the left central incisor septum may be a second, incipient abscess that is beginning to intrude into alveolar bone. However, the margin edges have dry bone attributes, so post-mortem damage cannot be ruled out. The left central incisor is missing, so it is not possible to ascertain whether this is a periapical or periodontal abscess, if either. Accordingly, this lesion is interpreted as an abscess of the periodontal pocket secondary to trauma rather than a periapical abscess arising from bacterial infection of the tooth pulp (Hillson, 2001; Laskaris, 2003:57).

The essentially healed status of the fractures suggest that this injury probably occurred no more than a year or so before death, so during the approximate mid-teens. However, in addition to the recurrence of infectious stress suggested by at least one periodontal abscess and palatal PR, a range of fracture sequelae may either be responsible for or contributed to his premature death. For example, the deviated septum provided yet another source of recurrent infectious stress since the obstruction of the osteomeatal complex is associated with respiratory infection (Latoni and Marks, 1995:117).

In addition, PR occurring within the so-called “dangerous zone” (Maes, 1937) or “triangle of death” that extends from the bridge of the nose to the corners of the mouth can have fatal consequences at any point during the recovery period. In non-antibiotic societies, the spread of staphylococcal bacteria from sinusitis or even an innocuous, localised infection of the skin or upper lip to the cavernous sinus and meninges of the brain via the interconnecting vascular network creates a substantial risk of rapid death (<1 week) from meningitis or cavernous sinus thrombosis. Common symptoms include swollen and edematous soft tissue and lips, severe pain, chills, and mounting fever; in the worst cases, thrombosed veins of the forehead are palpable, and the individual typically experiences delirium followed by coma, then death shortly thereafter (Maes, 1937:4). This risk of infection increases if the mouth or sinuses are exposed by open wounds or periodontal abscesses.

Close observation of the endocranial surface of the intact cranium is not possible, but a contre-coup impact on the posterior braincase is of very high potential considering the force needed to create the extensive damage observed along the entire mid-face. Adolescents are less susceptible to brain injury than younger children but still more vulnerable than adults (Anderson and Yeates, 2014). In individuals treated in emergency rooms, blows of this force to the face can cause closed-head concussion (Hutchison, 1997: 463); such brain injuries can produce observable symptoms of short to long duration, including, among others, headache, memory and cognitive difficulties, loss of consciousness, seizures and death (Levin et al., 2014). On the other hand, there is no cranial or postcranial evidence of subsequent accidental injury due to loss of balance arising from a neurological deficit associated with a cranial injury (Martin et al., 2008). Such a phenomenon is sometimes referred to as “injury recidivism” (Baustian et al, 2012:105).

Despite the complete flattening of the nasal bridge, it is not possible to confirm the occurrence or extent of a nasoethmoid fracture since the underlying ethmoid body cannot be observed in this intact cranium. The anterior margin of the left lateral (orbital) plate has dry-bone, post-mortem damage, but the right lateral plate is normal. If the tissues of the central region of the ethmoid were damaged by the intrusion of the nasal dorsum, a possible complication could include a higher risk of chronic sinusitis resulting from compromised nasofrontal sinus drainage (Dziadziola, Jr. and Marks, 1997). In addition, damage to the olfactory nerve, which transits through the fragile cribriform plate, can occur in even mild traumatic cranial injuries and result in the loss of the sense of smell (Hammond and Masel 2007:531).

Orbital rim “blow-out” fractures often prevent rupture of the globe, but such displacements can still result in impaired or lost vision due to damage to the orbital musculature (Stewart and Soparkar, 2005:61). Moreover, the depression of the nasals bones can damage the medial canthal ligaments that control the movement of the eyelids (Hutchison, 1997:453). Displacement of orbital bone can also damage the supraorbital nerve and the infraorbital nerve (from the V-1 and V-2 branches of the trigeminal nerve), leading to ophthalmic problems, loss of sensation in facial tissues and the anterior nasopharynx, the soft and hard palates, and the maxillary gums and teeth (Hammond and Masel, 2007:535).

Given the complications of significant mid-facial trauma when surgical techniques and antibiotics are available, the probability is high that HR 3 suffered many if not all of these sequelae as co-morbid conditions. Moreover, they may well have been exacerbated by a sub-optimal nutritional adequacy that existed prior to injury. On the other hand, despite the range of probable complications from this severe facial injury, that he survived long enough for fractures and most of the PR lesions to heal indicates a strong constitution at the time of injury. It also suggests that significant efforts were made to address physical needs that were multiple, diverse, disfiguring, and life-changing.

HR 4

Individual Profile: HR 4	
Observability	
Skeletal representation	post-cranial only; many re-associated bones
Bone condition	poor to good
Surface preservation	burned long bones, poor; pelvic, good
Demography	
Age	35-40 y; pubic symphysis and auricular surface
Sex	male: pelvic morphology and dimensions; FEM head (48 mm)
Paleopathology	
Enamel hypoplasia (P)	unobservable
Dental caries	unobservable
Ectocranial porosis	unobservable
Periosteal response	absent; lower limb bones are unobservable
Stunting	absent (max length of ulna, 26 mm)
Fracture/type	absent
Other	slight osteoarthritis: lipping, lumbar vertebrae
Broad Category	
Differential Diagnosis	

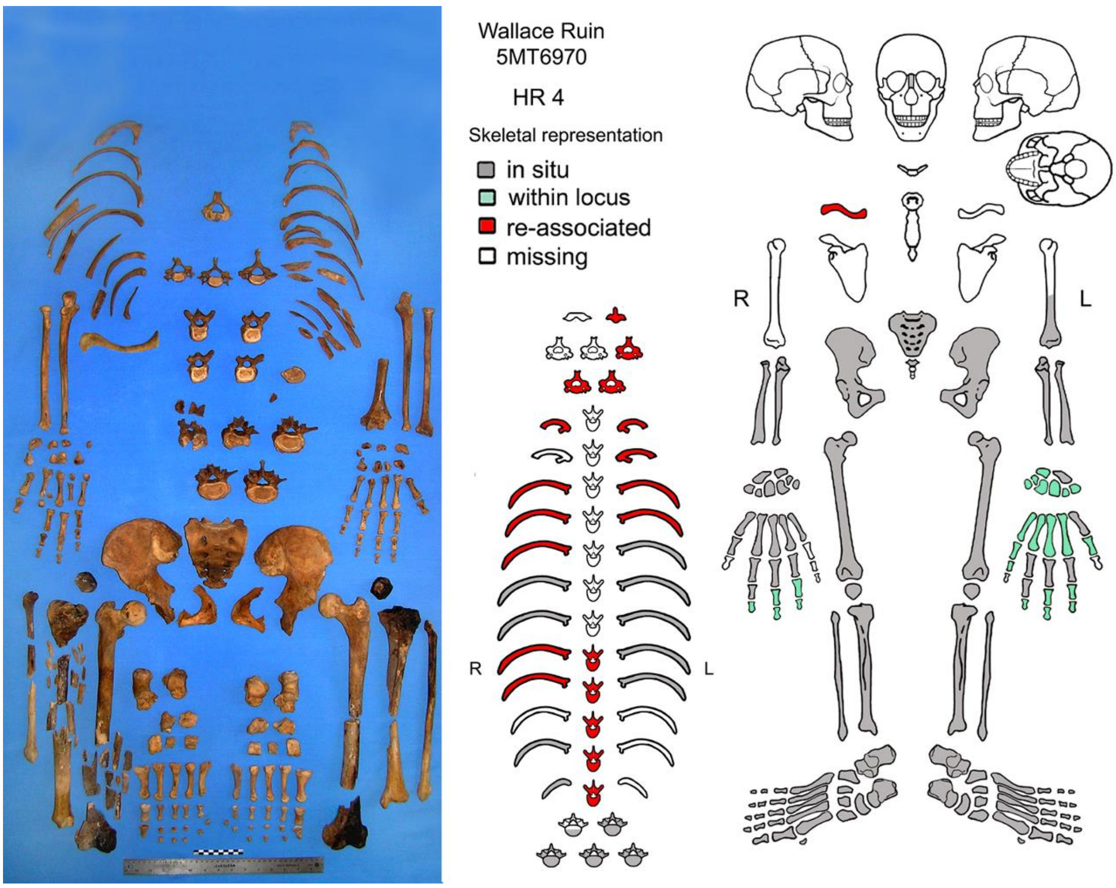


Fig. C.7: Photograph and visual representation of HR 4 skeletal elements.

The skeletonised remains of this robust adult male, in his thirties at the time of death, were intentionally disturbed in the prehistoric period; rodent burrowing contributes to this disarray. The cranium and mandible are missing, as are the 1st cervical vertebra, the scapulae, the right humerus, and the superior half of the fractured left humerus. The bones of the inferior skeleton are in situ, though significantly damaged by structural collapse and burning. Few torso bones are in situ; identifications as probable re-associations are based on bone development and robusticity.

HR 4 has no skeletal evidence of physiological stress or skeletal trauma incurred during life or at about the time of death. Unfortunately, the absence of all cranial elements means that LEH, EP and caries, which are conditions commonly observed in Ancestral Pueblo crania, cannot be appraised. In addition, it is indeterminate if this individual suffered non-lethal or lethal cranial fractures in a region of the body that is often targeted by Ancestral Puebloans of the Mesa Verde Region (Lambert, 2014). Reliable observations are possible for just infra-cranial trauma and longitudinal growth. All bone fractures exhibit dry-bone attributes. The accuracy of the assessment of longitudinal growth is satisfactory though not optimal since no lower limb long bone is suitable. Even so, the maximum length of the left ulna (26 mm) is equivalent to the mean (25.7 ± 1 cm) for males from the Point of Pines reference population.

Assessments of periosteal responses are limited to the bones of the upper limbs and the torso. The lower limb bones are fractured and friable, with bone surfaces damaged by exposure to a heat source following skeletisation. No PR lesions are present on any bone surface. This includes gross pathological conditions, which would be observable on the bones of the lower limbs.

Even though a comprehensive assessment of paleopathological conditions is not possible, other indicators provide insights into the general well-being of HR 4. His femora have thick, dense cortical bone at mid-shaft (8 mm) and comparatively large muscle attachments. This robusticity, in combination with the absence of evidence of stunting, suggests that this was an active individual who did not suffer significant or extended periods of constitutional frailty during periods of longitudinal growth or during adulthood. Whether this is an accurate description of his physical status in the months or so prior to death is unknown.

HR 5

Individual Profile: HR 5	
Observability	
Skeletal representation	essentially complete
Bone condition	good
Surface preservation	good
Demography	
Age	15 ± 3 y, dentition; 15-18 y, epiphyseal union
Sex	female: pelvic morphology and dimensions, FEM head (35 mm)
Paleopathology	
Enamel hypoplasia (P)	absent
Dental caries	2-3 occlusal surface, small
Ectocranial porosis	orbits: MX/MD; parietals, R temporal, sphenoid, CR/SL; mandible: MX/SL
Periosteal response	occipital, sphenoids, maxilla body: CR/SL; temporals: MX/SV; L tibia: CR/SL
Stunting	absent (FEM length: 37.6 cm); unfused distal epiphysis
Fracture/type	absent
Other	alveolar resorption, dental calculus
Broad Category	nutritional deficiency
Differential Diagnosis	scurvy

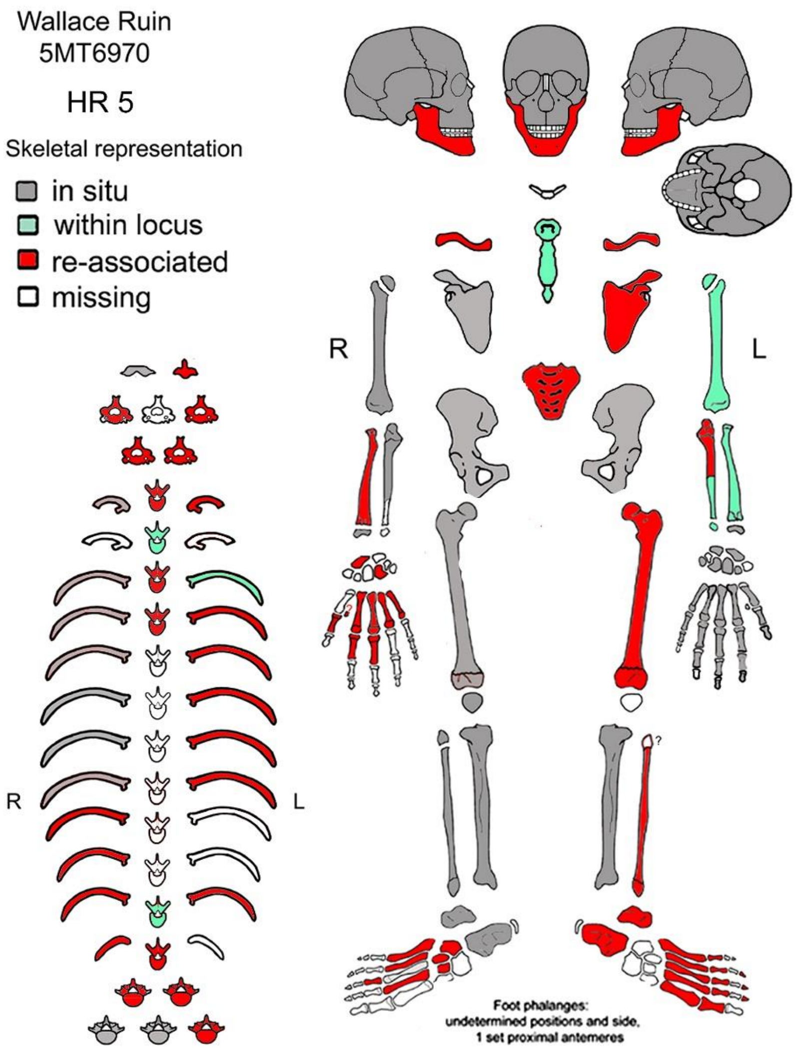


Fig.C.8: Schematic representation of HR 5 skeletal elements.

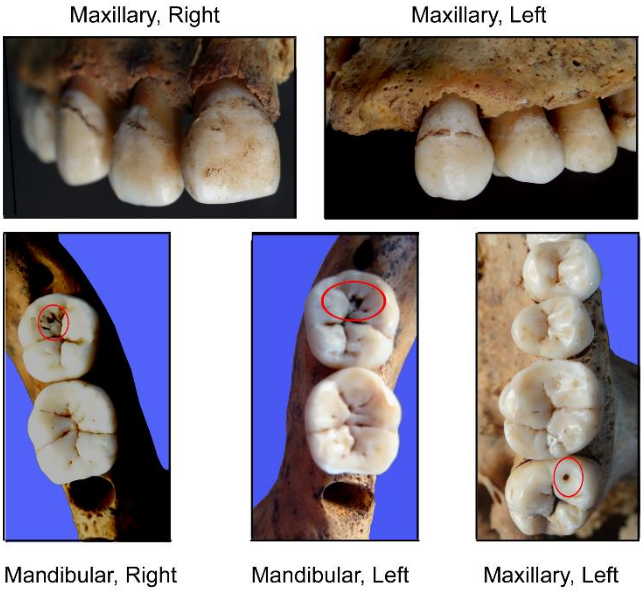
HR 5 is the older of two primary burial deposits on Surf 2, the lower of the two Pueblo III floor surfaces in Room 17a. Most bones are intact, apart from minor dry-bone damage; however, this individual's skeletised post-crania were significantly disturbed by animal burrowing. As indicated in Figure C.7, numerous bones are re-associated to HR 5. Surface preservation is generally good, allowing high confidence in observational accuracy.

Age and Sex

Tooth eruption and the development of the maxillary third molar root provide a confident age estimate of 15 ± 3 years (Ubelaker, 1989: Fig.71); however, the pattern of epiphyseal union suggests that this individual is 15-18 years old (Scheuer and Black, 2004). The presence of several vertebral epiphyseal rings indicates that HR 5 had entered puberty (Steele and Bramblett, 1988), the period in which the pelvis acquires its sexually dimorphic configuration. HR 5 is diagnosed as female based on visual inspection of the subpubic region (Phenice, 1969) and osteometric sexing of the short, broad and flat sacrum (Sacral Index, 115) and femoral head diameter. The distal femur epiphysis is unfused, which allows for longitudinal growth potential. However, the size of the incompletely fused femoral head is unlikely to increase substantially. Compared to the Point of Pines reference population (Bennett, 1973: Tables 21, 23), the femoral head diameter (35 mm) is substantially less than the Late Period female (40 mm) or male (48 mm) mean, as well as the 42.6 mm sectioning point.

Paleopathology Summary

Three of the six observable indicators evidence a skeletal response: caries, ectocranial porosity and periosteal responses. Two, or possibly three, permanent second mandibular molars have a small occlusal crown cavity (Fig.C.8). The use of a dental probe confirms that two cavities have carious potential since they intrude into dentine. Potentially, a cavity within the fissure of another molar may be carious; no opening into the dentine was detected by probing, but this method yields low detection rates even when performed by dentists (Hillson, 2001:261). Small calculus deposits on multiple anterior and cheek teeth provide a more pervasive indicator of poor oral health, as is loss of bone at the anterior palatal and maxillary alveolar margins adjacent to long-erupted teeth. In concert, these conditions are consistent with a moderate inflammatory response that is unrelated to tooth eruption.



C.9: HR 5 Oral health conditions. Carious lesions are circled in red. Note the calculus deposits on the anterior and check teeth of the left and right maxilla, and the remodelling alveolar bone adjacent to long-erupted teeth.

Abnormal Porosity

Diploic expansion is unobservable in this intact cranium. However, abnormal porosity occurs within multiple cranial elements and the mandible (Fig C.9). Each frontal orbit contains incompletely healed lesions of moderate severity. A region of healed, slight, and diffuse porosity (EP) extends across the central calvarium (posterior frontal and medial parietal bones); the parietal bosses and superior occipital are unaffected. The vast majority of the pores are pin-point in size, but a very few have coalescing foramina. Porous responses at bregma are not uncommon (Mann and Hunt, 2012:19), but this expression extends to the posterior parietals. In addition to these, scatters of healed pin-point to 1 mm diameter porosities are observable on the right inferior sphenoid. The inferior left sphenoid is unobservable, but the superior section has no abnormal pitting. Abnormal pitting of the anterior temporals is largely unobservable because these areas are overlain by deposits of PR; however, a few healed pores are visible along the inferior border of the right temporal. The posterior temporals have no abnormal pores, and the posterior maxilla and zygomatic bones are unobservable due to post-mortem erosion. Finally, both medial coronoid process of the mandible has abnormal porotic bone. Each response is largely healed, but remodelling is not yet complete in the more superior regions.

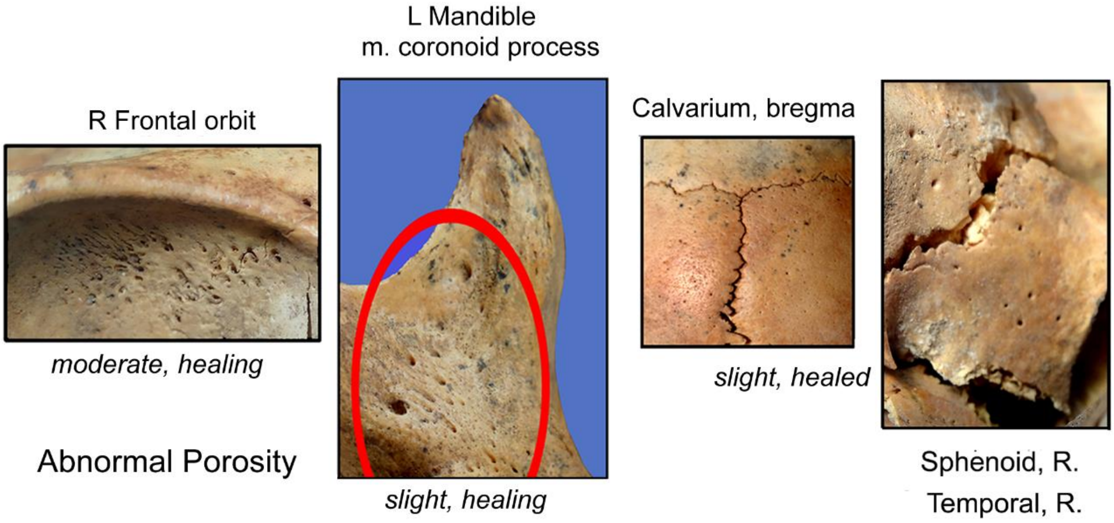


Fig. C.10: Abnormal porotic responses in HR 5 cranial elements.

Periosteal Response

Several cranial bones and one tibia have subperiosteal responses, though no deposits lack evidence of healing (Fig. C.10). Excepting the tibiae, all involve bilateral responses. The most severe expressions involve sheets of undulating PR that cover the posterior-superior margins of the sphenoids and the anterior halves of the temporal bones. The PR of the sphenoids is healed whereas the temporal lesions include a mixture of healed and incompletely remodelled lesions. The temporal lesions appear to be layered, which may represent either a prolonged or chronic condition. Slight, remodelled PR deposits are also present on the “cheeks” of the maxillary alveolar processes. The anterior alveolar region cannot be evaluated due to post-mortem damage.

HR 5 also has a small region of barely discernible PR on the medial mid-shaft of the left tibia. Rather than more commonly observed PR lesions, in which appositional bone sits upon the bone surface, this response represents a very well-healed condition in which remodelled lamellar bone has become incorporated into the cortical surface. The diffuse, pin-point pores within this region thus represent an intrusive response produced by the vascularity that penetrates into the lamellar level during the advanced stage of remodelling (Ortner, 2003: 206).

Summary

This evidence suggests that HR 5 did not experience an intrinsic physiological stress sufficient to disrupt tooth crown formation except, perhaps, between 2.5-3.0 years of age; this etiological age is common in MVR populations even if slightly younger than the peak age-at stress of 3.0 to 3.5 years (Malville, 1997). The absence of anterior tooth DEH is unusual, compared to other P3WR14 individuals (this study) and MVR populations (Ibid.). None of the six observable anterior teeth has enamel hypoplasia; this includes the maxillary central incisors and canines, the teeth most sensitive to physiological stress (Goodman et al., 1980). However, this record of enamel disruption is incomplete since six anterior teeth and right 1st premolar of the mandible were lost post-mortem. Of the 14 posterior teeth, only the left mandibular 1st premolar has a single linear horizontal groove; the etiological age of 2.7 years is determined using the regression formula devised by Goodman and Rose (1990). In the absence of other enamel defects, the probability is that this lesion is the product of a localised trauma (Malville, 1997).

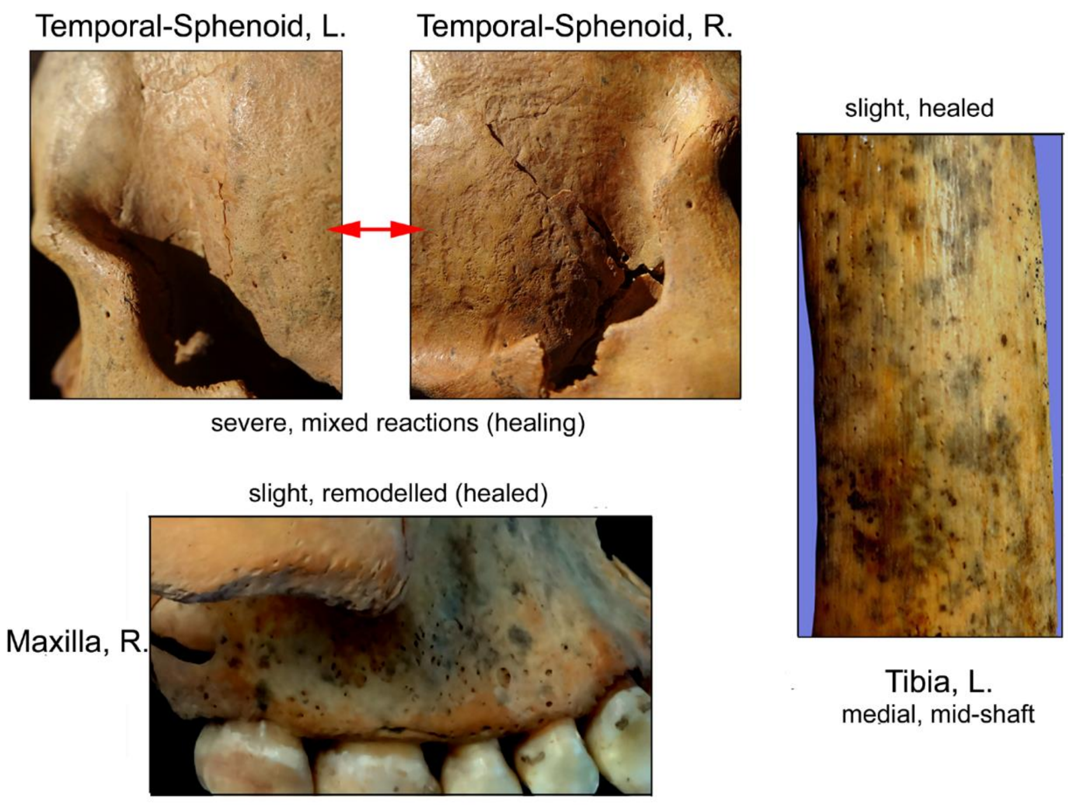


Fig C.11: Abnormal appositional bone (PR) in HR5 cranial elements and left tibia.

However, other skeletal stress markers indicate that nutritional insufficiency was a recurrent though not necessarily persistent problem. The vault and orbital EP occur in cranial regions that can be produced by Vitamin B deficiency, expressed as megaloblastic anaemia, or Vitamin C deficiency resulting in scurvy (Brown and Ortner, 2011; Walker et al.ioti, 2009; Mann and Hunt, 2012: Fig. 2; Melikian and Waldron, 2003: Fig.3). Another possibility is that the calvarium lesions are related to a scalp inflammation unrelated to a nutritional disorder (Ortner, 2003:97). Since diploic thickness of the vault cannot be observed directly, and since this study does not make use of microscopic analysis of the orbits, as recommended by Schultz (2003) it is not possible to make a reliable differential diagnosis regarding the EP of the calvarium and orbits. At any event, the likelihood is that HR 5 experienced both diet-induced anaemia and scurvy, possibly as co-morbid conditions, since each can arise from a maize-reliant diet that is deficient in Vitamins B-12 and C. The completely or almost remodelled state of the porosities within these two regions indicates an etiological age many months if not years prior to death. In addition, the difference in the state of healing vault and orbital lesions may represent differential rates of tissue turnover rather than separate bouts of nutritional stress.

On the other hand, a differential diagnosis of scurvy can be made regarding the pattern of porotic and PR responses of the anterior temporals and the coronoid process of the mandible. Most significantly, the pitting of the sphenoid is pathognomonic for scurvy (Brown and Ortner, 2011:198-199; Ortner et al., 2001:347). The alveolar resorption observed in the anterior maxilla could be related to an inflammatory response involving the breakdown of gingival tissue during a scorbutic episode (Touyz, 1984:840). Alternatively, the calculus deposits present on most of the maxillary teeth may mean that this PR is simply the product of poor oral health associated with a cariogenic diet.

HR 5 experienced at least two episodes of scurvy. The healed pits of the sphenoid and temporal represent an episode well before death. In contrast, the mixed reactions of the mandibular pitting and the PR in the temporals points to a scorbutic response near to the time of death. The PR of the alveolar process is healed, but the bone is not as compact as that of the sphenoids, so perhaps concurrent with the second scorbutic episode.

Based on this evidence, the bout represented by the healed sphenoid porosities could have been co-morbid with the healed EP lesions, but this is by no means certain since either skeletal reaction could have developed and healed long before death. In contrast, it can be stated unequivocally that the incompletely healed lesions associated with the second episode of scurvy are not concurrent with the vault-orbital EP since this bout occurred in the weeks or months before death.

The occurrence of PR in a single long bone is more consistent with a focal response rather than systemic infection, especially since the tibia mid-shaft is a common location for PR secondary to trauma (Ortner, 2003:206). However, a localised haemorrhage from even a very slight knock is more likely to occur in a scorbutic individual. Assuming so, this lesion could be co-morbid with the sphenoid pitting but not the incompletely healed EP and PR of the cranial elements.

Despite this evidence of nutritional deficits, it seems that these episodes were not prolonged or severe enough to cause stunting, at least in comparison to other Ancestral Puebloans. For reasons explained in the previous chapter, longitudinal growth of older adolescents is evaluated using the mean maximum femoral lengths from skeletally mature males and females from the Point of Pines reference population. Measurement taken with the unfused epiphysis in anatomic position yields a maximum length of 37.6 cm. Although less than the PoP female mean of 39.7 ± 2.3 cm, this result means that the femur is of average length since it falls within the first standard deviation. The HR 5 tibia is more developed than the femur, with partial union of both terminal epiphyses. The almost-achieved length (31.8 cm) is also within the lower 1st SD for the Point of Pines female mean of 33.4 ± 2.0 cm. These findings indicate that HR 5 long bones were already of average length, even without taking into consideration the high potential for additional longitudinal growth of the femur.

In summation, the skeletal data suggests that HR 5 experienced at least two bouts of nutritional stress. The absence of enamel defects in the anterior teeth suggests two possibilities: either that healed EP lesions developed after the completion of crown formation, so beyond the age of seven; or, that a physiological stress was insufficient to affect both skeletal and tooth tissues simultaneously. The apparent layering of PR lesions in small areas on each temporal may represent a prolonged or chronic response in the second bout of scurvy. Even if so, the skeletal evidence does not signal a pattern of long-standing physiological stress and constitutional frailty; or at least, no more than the typical insufficiencies inherent in a maize-reliant diet. All but a few of the porotic lesions are well-healed, and longitudinal growth is already within the normal range for fully developed femora and tibiae. Moreover, the locations of PR deposits are consistent with an inflammatory response to scurvy during chewing rather than infection. Whether the alveolar resorption is caused or exacerbated by gingival inflammation during a scorbutic episode or just poor oral health is unknown. Since Vitamin C is necessary to form bone collagen, lesions associated with scurvy can only develop during convalescence (Brickley and Ives, 2008). It thus appears that HR 5 succumbed to an acute infection or gastrointestinal disorder before a skeletal response could occur. Possibly, her dental caries instigated a bacterial infection that her immune system could not withstand during a period of constitutional frailty.

HR 6

Individual Profile: HR 6	
Observability	
Skeletal representation	essentially complete
Bone condition	good
Surface preservation	good
Demography	
Age	8 ± 24 m, dentition
Sex	undetermined due to age
Paleopathology	
Enamel hypoplasia (P)	mandibular central incisors; 1.5-2.0 y
Dental caries	absent (potential)
Ectocranial porosis	orbits: MX/MD; vault, sphenoid, post. maxilla:CR/SL
Periosteal response	localised; endocranial frontal, hard palate: CR/SL systemic: 5 long bones; U and L limbs; MX-CR/SL-MD
Stunting	absent (FEM diaphysis: 250 mm)
Fracture/type	ante-mortem; parietal, clavicle, radius: CR
Other	Amelogenesis imperfecta
Broad Category	nutritional deficiency
Differential Diagnosis	scurvy; developmental collagen disorder

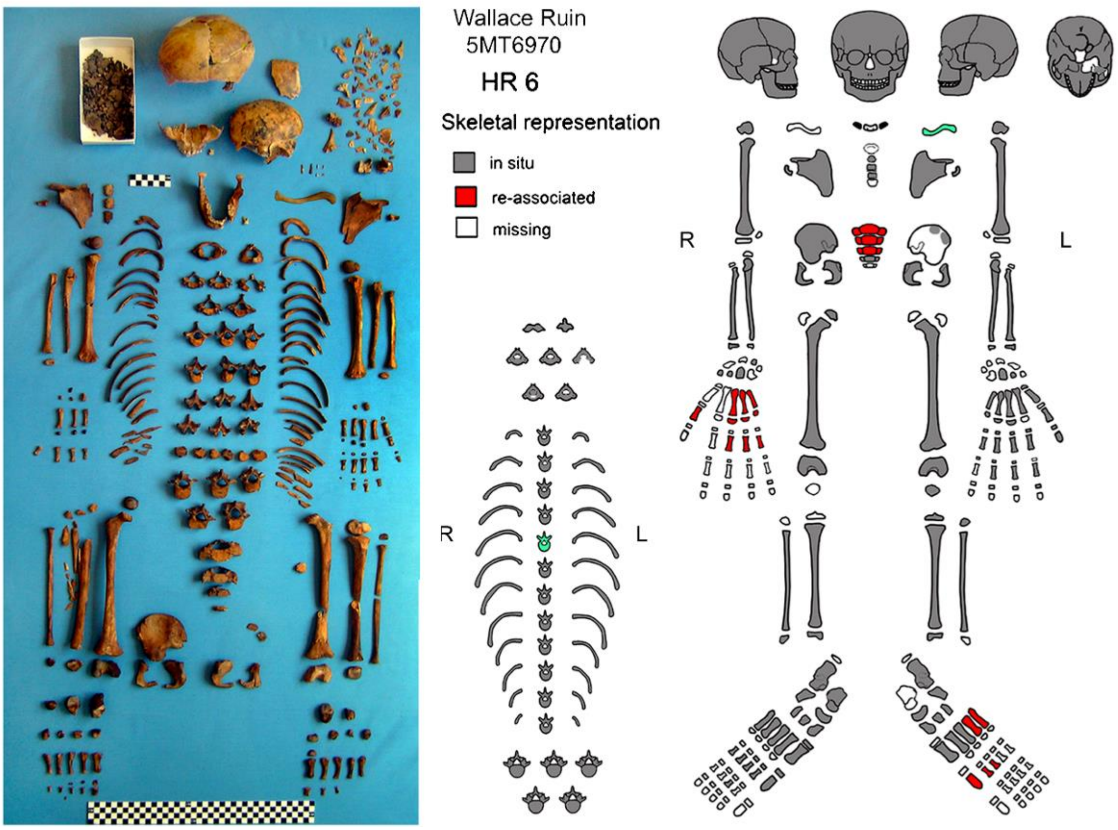


Fig. C.12: Photograph and schematic representation of HR 6 skeletal elements.

HR 6 is the younger of two primary burials deposited upon Surf 2, the lower of the two Pueblo III floor surfaces in Room 17. This essentially complete and undisturbed skeleton (Fig. C.12) lacks only the right clavicle and a few bones from the hands and feet. Several cranial and post-cranial bones have dry-bone fractures incurred during wall collapse. Even so, surface preservation is generally good, allowing high confidence in observational accuracy.

Paleopathology Summary

The skeletal remains of HR 6 show the highest level of skeletal physiological stress of the P3WR14 individuals. Potentially, several conditions are co-morbid. Four of the six observable indicators evidence an intrinsic response to recurrent nutritional insufficiency, systemic infection or a developmental collagen disorder. A diagnosis of healed scurvy is made based on completely remodelled pitting of the sphenoid (Brown and Ortner, 2011). The occurrence of three healed fractures, involving three skeletal regions, also sets HR 6 apart. Possibly, this pattern of fracture is also related to nutritional-collagen deficiency. However, there is no evidence of stunting. In addition, each skeletal indicator was either healing or healed at the time of death.

Enamel hypoplasia (permanent)

Both mandibular permanent central incisors have (P)EH in the form of a single large pit. Measured from defect mid-point, the etiological age of each is 1.5-2.0 years (Malville, 1997), though the entire period of enamel disruption last from 1.5 to 2.5 years as determined from the inferior and superior margins. This age-at-stress is substantially lower than the MVR peak age-at-stress of 3.0-3.5 years (Malville, 1997); however, the absence of defects in the sensitive permanent maxillary incisors and the two observable mandibular canines suggests that this episode was not particularly severe (Fig. C.13).

Another possibility is that these pit defects represent an underlying developmental disorder rather than a physiological stress. Deciduous and permanent teeth of HR 6 evidence several enamel hypomineralisation abnormalities. According to Shuurs (2013), tan-brown colouration, brown stains, parallel wrinkles, enamel fractures and unusual morphological features and clefts are common attributes of the disorder known as Amelogenesis imperfecta. This condition can occur as a new mutation, but it usually involves autosomal inheritance.

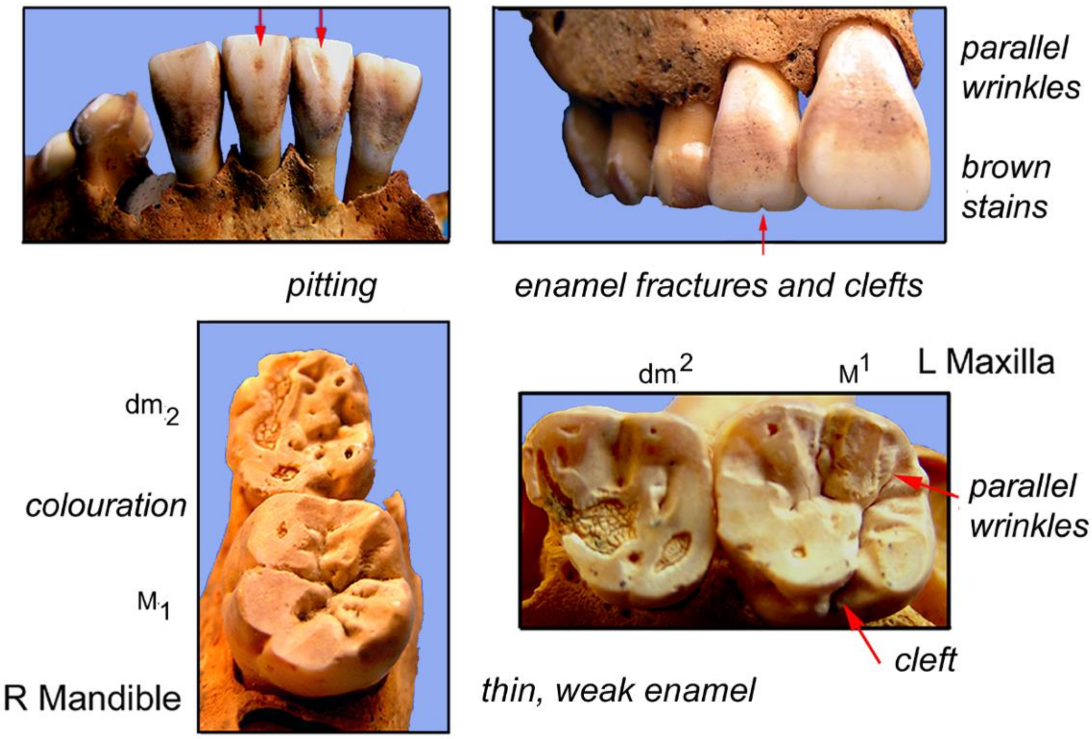


Fig. C.13: Enamel disruptions and hypomineralisation defects and anomalies in the mixed dentition of HR 6.

Porotic Responses

Abnormal porosity is observable in several cranial and infra-cranial bones (Fig. C.14). The most notable response involves bilateral, incompletely healed orbital lesions. This reaction presents the most severe appearance in P3WR remains, but, following Martin and colleagues (1991:152), it is considered moderately severe since there are no formations that rise above the bone surface. Observations regarding the right orbit are hindered by post-mortem damage, but the left orbit is in good condition. Marrow hyperexpansion is unobservable for both orbits, but the surface of the medial two-thirds of the left orbit is dominated by significantly remodelled, pin-point to 1 mm pores. A number of the larger pores intrude into cortical bone. This region of abnormal porosity extends beyond the orbital roof, onto the anterior frontal in the area of the supra-orbital notch. In contrast, the latero-superior region contains large, sinuous, and irregularly shaped lesions, in addition to pin-point to 1 mm pores. In several instances, underlying diploic tissue is visible. Regardless of configuration, the rounded margins of all lesions provide evidence of healing.

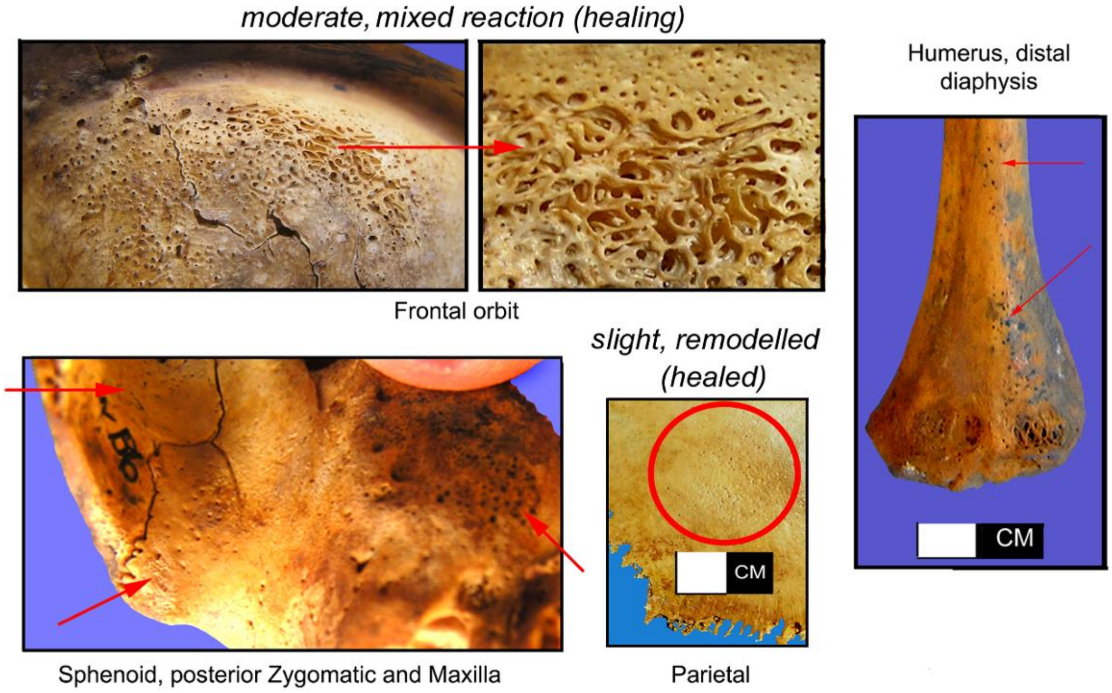


Fig.C.14: Abnormal porotic bone in HR 6 skeletal elements; all responses are healing or healed.

Without microscopic analysis of orbital thin sections, it is not possible to ascertain whether the porous appearance of the bone within each medial orbit is associated with scorbutic appositional bone or the diploic expansion produced by megaloblastic anemia (Schultz, 2003). The appearance of the medial orbital lesions is similar to the example provided by Brown and Ortner (2011: Fig.1) as a skeletal response to haemorrhage associated with scurvy, although there are no vascular tracks. On the other hand, though microscopic analysis might prove otherwise, the trabecular-like configurations of the lateral manifestations suggest marrow hyperexpansion (Brickley and Ives, 2006:170). No layering of lesions is discernible using a macroscopic method. Whether these notable differences in pore configurations by orbital subregion represents normal variation during remodelling, separate stress episodes or co-morbid Vitamin B-12 and Vitamin C deficiencies is unknown.

On the other hand, abnormal porotic bone consistent with a diagnosis of scurvy is present in the cranial region involved in chewing motions. The left sphenoid and posterior zygomatics have scatters of 1 mm porosities, and the left posterior maxilla has a dense, continuous region of healed pin-point to 1 mm pores. The right sphenoid and posterior maxilla are unobservable. These lesions are healed;

however, they are slight in appearance compared to examples provided by other researchers (Brown and Ortner, 2011; Ortner et al., 2001, Geber and Murphy, 2012). That these lesions are not active (unhealed) or remodelling during convalescence suggests that HR 6 was no more than moderately deficient in Vitamin C. In addition, slight scatters of pin-point lesions extend beyond the cutback zones of the distal humeri, the left distal ulna and possibly the right distal radius. Although bone surface preservation is generally good, there is sufficient degradation to hinder reliable observation of the joint regions of the lower limbs. The scapulae and ribs are observable and clear of lesions of any type.

The ectocranial vault surfaces are clear of porotic responses at boss and the central calvaria. However, the posterior cranium (medial parietals and superior occipital) contains a few small regions of healed, pin-point porosity. Vault thickness is observable, and there is no diploic expansion. It thus appears that these endocranial pores represent a subperiosteal, vascular intrusion into the ectocranial bone rather than the marrow hyperexpansion that can occur with megaloblastic (B-12) anaemia. However, in view of the cautions raised by McIlvaine (2015), in which B-12 marrow hypertrophy is inhibited by insufficient iron, there is a reasonable chance that HR 6's lack of diploic thickening actually involves the co-occurrence of B-12 and iron deficiency anaemia rather than the absence of megaloblastic anaemia.

Periosteal Response

Two cranial and several infra-cranial elements have abnormal bone deposits; all lesions are either healed or healing or (Fig. C.15). One of the cranial lesions comprises an irregular, narrow (85 x 10 mm) and isolated island of calcified plaque is located on the endocranial surface within and just superior to the frontal crest. The other deposit consists of a thin sheen of sclerotic bone that covers the central region of the palatal process. Developmental remodelling associated with tooth eruption is present along all alveolar margins. In addition, each canine eminence has a small, circular region of sinuous woven bone that overlies the crypt of an unerupted and developing maxillary canine (¼ root). The view here is that these manifestations represent normal remodelling as the crypts expand in response to root growth rather than pathological inflammation.

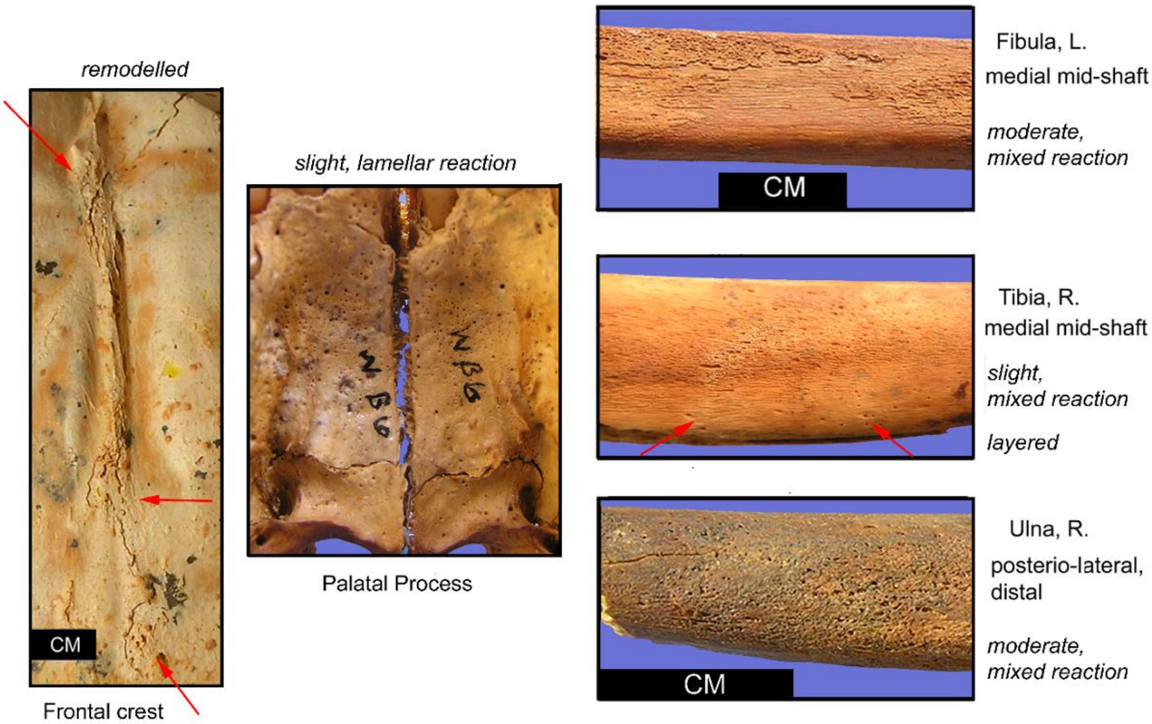


Fig. C.15: Abnormal new bone formations in HR 6 skeletal remains; all responses are either healed or healing.

Five of the 12 (42%) long bone diaphyses have healed or healing PR lesions. Both upper and lower limbs are affected. Most of the deposits are concentrated along the mid-shafts, but those of the left ulna also cover the distal end of the posterior diaphysis. Bilateral occurrences affect the ulnae and tibiae. Although the left fibula has a mixture of healed and healing PR of moderate severity, its antimere is unaffected, as are the femora. Using the standards of Martin and colleagues (1991), the HR 6 tibial lesions are of slight severity, whereas the other four affected bones are moderately affected. The tibiae reveal at least two distinct episodes of stress. Each shaft has lamellar pitting, a hallmark of well-healed bone (Ortner, 2003:206). As documented in Figure C.14, these pits are adjacent to incompletely remodelled woven bone.

Ante-mortem Fractures

HR 6 has three small (<1 cm), healed fractures involving the cranial, thorax and appendicular skeletal regions (Fig. C.16). A shallow, semi-circular depression fracture roughly 50 mm in diameter is located on the posterior right parietal. This wound is no more than 2-3 mm deep along its well-defined superio-lateral margin. The left clavicle has a green-stick fracture of the anterior surface at mid-shaft.

This small wound is either so well-healed, or originally so slight, as to be discernible only through palpitation. The small green-stick fracture of the anterio-distal diaphysis of the left ulna is more readily observable, though also healed. Together, the small dimension and rounded, well-defined margin of the parietal wound is consistent with impact from a pebble or possibly an antler tine. The posterior location of this lesion allows for the possibility that this wound, though small, is the result of intentional, non-lethal violence though it could just as well represent accidental injury (Walker, 1997). The ulna and clavicle wounds are in locations of common accidental injuries sustained by children during falls or while playing (Vitale, 2010).

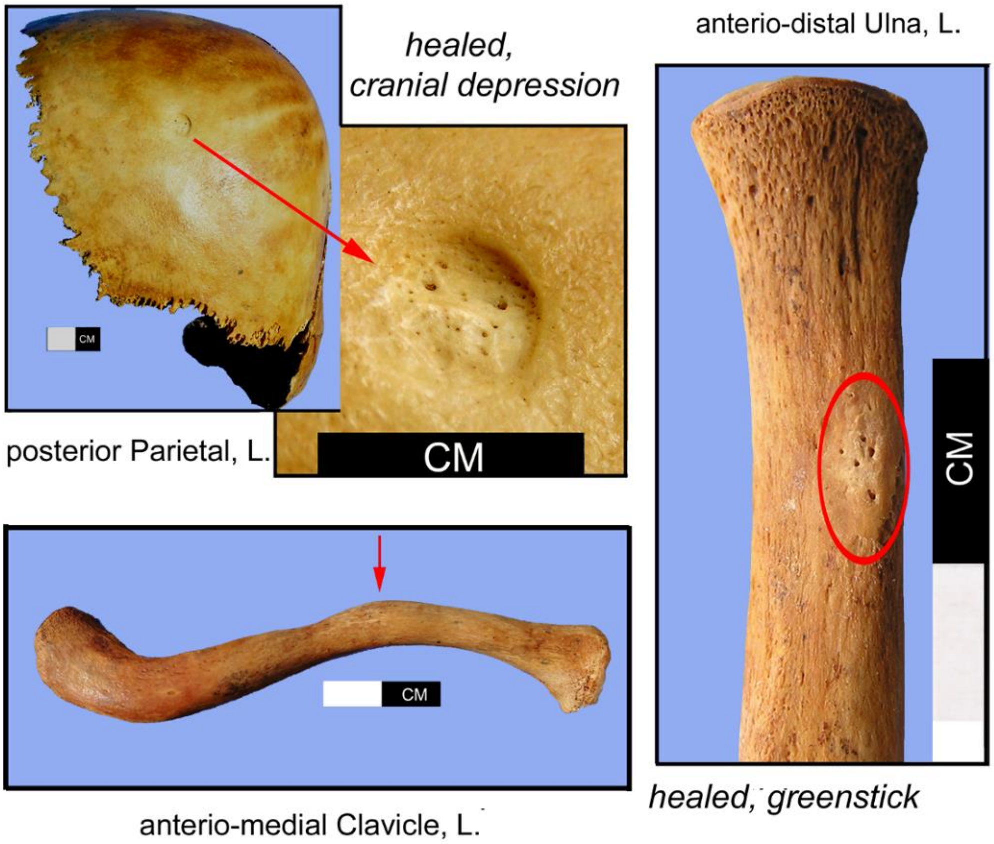


Fig. C.16: Locations and appearance of the three healed fractures of HR 6.

Summary

If the dental evidence provides a sensitive indicator of physiological stress, apart from one episode at about 1.5 years of age, HR 6 seems not to have experienced prolonged or severe episodes of ill-health sufficient to disrupt anterior tooth crown formation prior to almost seven years of age. The absence of evidence of stunting, in comparison to same-aged children from Grasshopper Pueblo, also suggests that nutritional and infectious stress were not significant problems for most of this child's life. However, the range of porotic and periosteal responses indicates that at some point, HR 6 experienced one or more bouts of nutritional insufficiency: one when counting the healed scurvy lesions, and two, if the incompletely healed orbital lesions represent a subsequent episode of nutritional stress. The absence of P(EH) after the age of about 2 years allows for the possibility that the well-healed scorbutic lesions developed during that period.

A case can be made for a general nutritional deficiency in the form of megaloblastic anaemia and perhaps iron-deficiency anemia. However, a firm diagnosis of scurvy is made based on the pitting of the observable left sphenoid, as this response is pathognomonic for scurvy (Brown and Ortner, 2011). Supporting evidence is provided by pitting within cranial elements involved in chewing motions and also by the scatters of pits on long bone diaphyses beyond cutback zones.

These scorbutic responses are healed, which indicates that they are not concurrent with incompletely healed PR lesions of several long bones that are indicative of a systemic infection. Such infections are often co-morbid with nutritional deficiencies. The numerous occlusal surface pits associated with the hypomineralised tooth enamel may have provided a source of bacterial infection.

Three healed fractures occur in regions that are common locations for accidental injury in children (Vitale, 2010). Alternatively, given the skeletal evidence of scurvy, one or more of this child's three fractures could represent a pathologic frailty due to inadequate osteoid formation (Brown and Ortner, 2011:197). Alternatively, the presence of Amelogenesis Imperfecta allows for the possibility that HR 6 also suffered from Osteogenesis imperfecta Type I, a genetic collagen disorder. The healed endocranial lesion could represent a small bleed associated with scurvy.

It may be that this child eventually succumbed to the systemic bacterial infection evidenced by the mid-shaft PR of multiple long bones. The still healing status of these lesions suggests that HR 6 was experiencing some degree of physiological stress at the time of death, even if convalescent. Assuming so, then he or she would have been at a higher risk for sudden death, either from resurgent infection or an unrelated, acute condition.

HR 10

Individual Profile: HR 10	
Observability	
Skeletal representation	essentially complete
Bone condition	good
Surface preservation	good
Demography	
Age	15 ± 3 y, dentition; 15-18 y, epiphyseal union
Sex	female; pelvic morphology and dimensions; FEM head (37 mm)
Paleopathology	
Enamel hypoplasia (P)	absent
Dental caries	absent
Ectocranial porosis	orbits and posterior parietals: CR/SL
Periosteal response	absent
Stunting	absent (FEM length: 42.3 cm); partial union, distal epiphysis
Fracture/type	ante-mortem; partial; 5th metatarsal: CR
Other	sacralised 12th vertebra
Broad Category	nutritional deficiency
Differential Diagnosis	

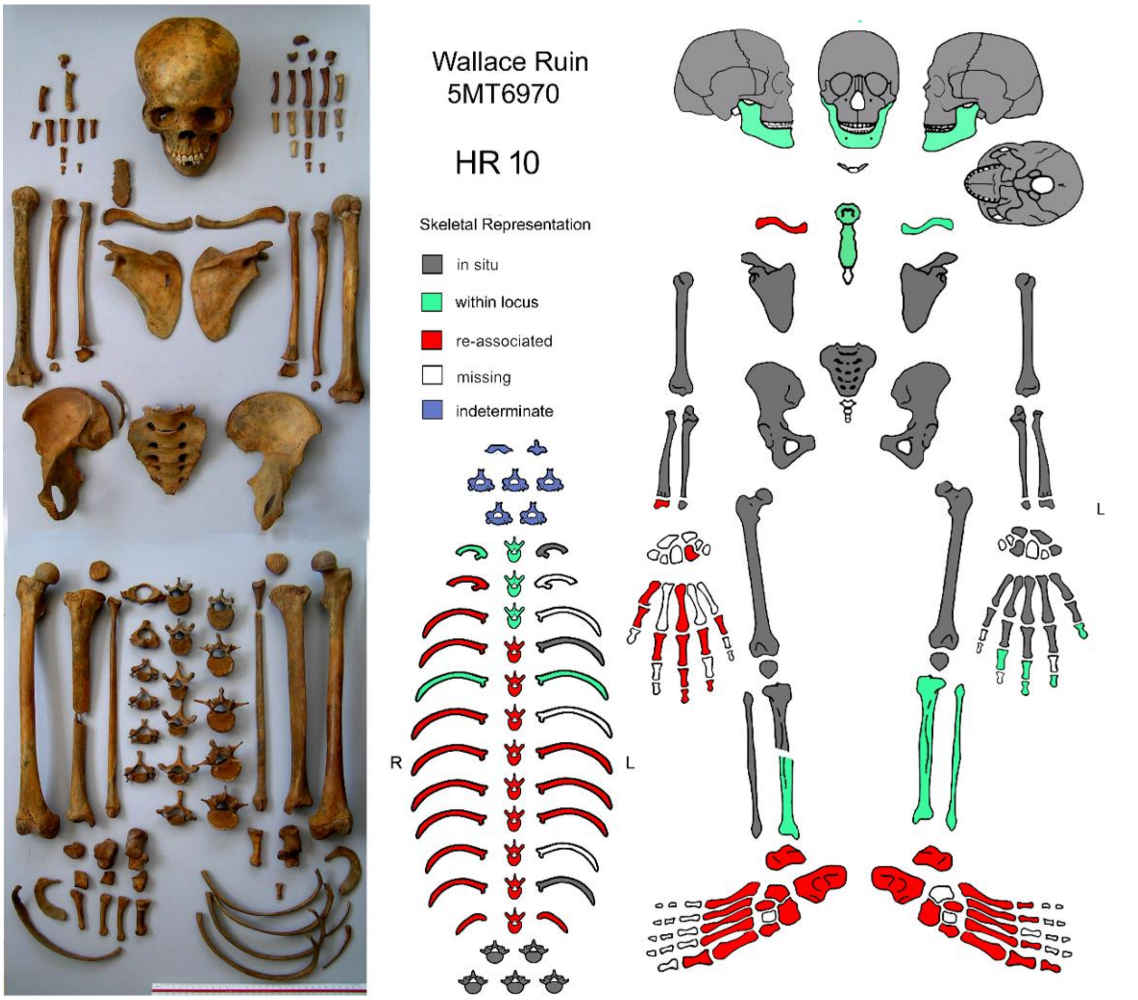


Fig. C.17: Photograph and schematic representation of HR 10 elements.

The older adolescent female HR 10 is represented by a nearly complete skeleton (Fig. C.16). Most bones are intact apart from minor dry-bone damage. The excellent preservation of bone surfaces allows a high degree of confidence in observational accuracy. Post-depositional disarray is moderate. Animal burrowing displaced most of the bones of the torso, the right hand and both feet. However, all but a few of these are re-associated.

Age and Sex

HR 10 is 15 ± 3 years of age based on dental development (Ubelaker, 1989a, Fig. 71). Skeletal development in respect to epiphyseal union (Scheuer and Black, 2004) indicates an age of 15 to 18 years of age, which means that this individual is sufficiently mature for a determination of sex. HR 10 is confidently diagnosed as female based on the concordance of results obtained by visual inspection of the subpubic region (Phenice, 1969) and osteometric sexing of the os coxae (Murail et al., 2005). A femoral head diameter of 37.0 mm is also consistent with a female male determination of sex in terms of the Point of Pines reference population. Cranial features are ambiguous, but this is often the case for MVR Ancestral Pueblo populations.

Paleopathology Summary

Of the six observable indicators, a skeletal response to stress involves only ectocranial porosis and ante-mortem trauma. The lateral region of each orbit contains healed pin-point to 1 mm diameter pores. Well-healed porotic bone is present on the posterior parietals near mid-line. These roughly circular zones, some 4-5 cm in diameter, contain barely discernible to 1 mm diameter porosities (Fig. C.18). Diploic expansion is not observable in this intact cranium. The left 5th metatarsal has a commonly acquired accidental injury in the form of a small, well-healed greenstick fracture of the lateral surface at mid-shaft (Galloway, 1999).

In keeping with the near absence of indicators of prolonged or significant physiological stress, HR 10 evidences above-average longitudinal growth. The distal femoral long bone epiphysis is in partial union, which suggests that longitudinal growth is at or near completion. Consistent with female pelvic morphological features and measurements, the HR 10 femur is gracile. The femoral maximum head diameter of just 37 mm is well below the sectioning point of 42.6 mm derived using data from Point of Pines male and females. Even so, her maximum femoral length of 42.3 cm is just below the 42.4 cm threshold of the 2nd standard deviation from that same reference population.

It thus appears that HR 10 experienced a good level of health for most of her life, apart from a bout of nutritional stress of undetermined aetiology many years before death. Yet, the absence of active or even incompletely remodelled stress indicators suggests that she succumbed to an acute infection or gastrointestinal disorder before bone tissue could register a response.

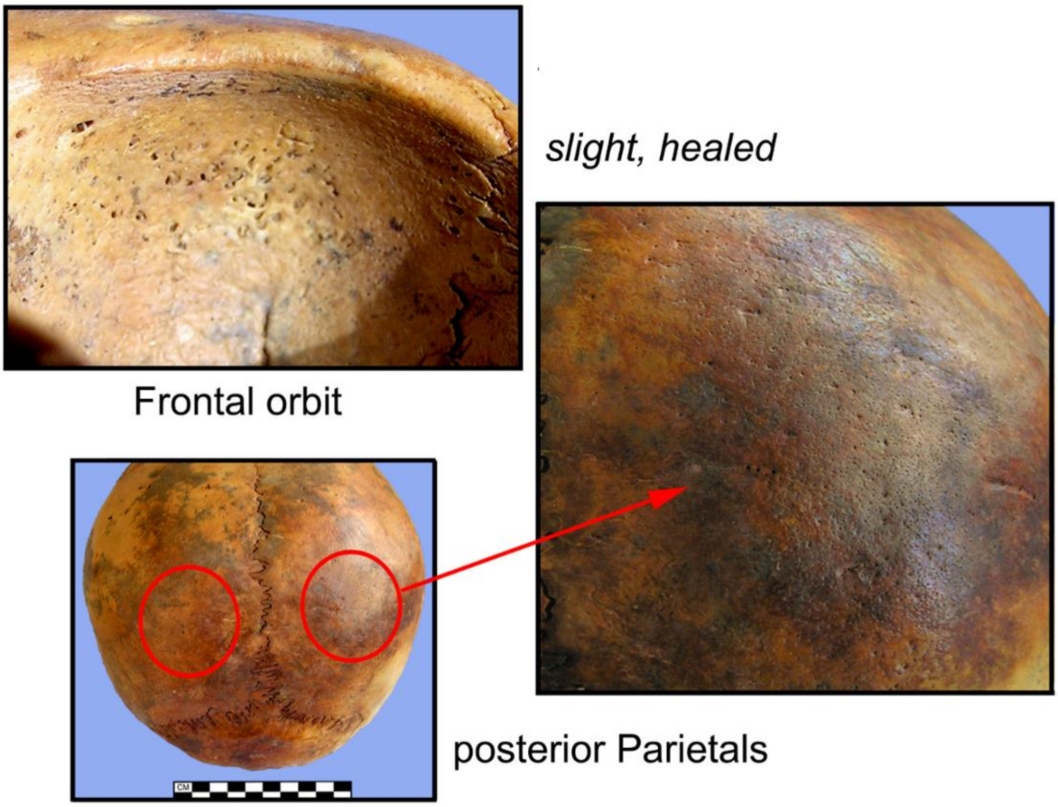


Fig. C.18: Abnormal porotic responses in HR 10 cranial elements.

HR 11

Individual Profile: HR 11

Observability	
Skeletal representation	essentially complete
Bone condition	cranial, poor; infra-cranial, good
Surface preservation	cranial and in situ bones, fair; disturbed bones, good
Demography	
Age	35-40 y; pubic symphysis, auricular surface, rib ends
Sex	male; pelvic morphology and dimensions; FEM head (47 mm)
Paleopathology	
Enamel hypoplasia (P)	systemic; 4/9 anterior teeth, 3.0-3.5 y
Dental caries	5 occlusal surface, small; maxillary and mandibular
Ectocranial porosis	orbits, parietals and occipital; CR/SL; no marrow expansion
Periosteal response	absent
Stunting	absent (FEM length: 44.2 cm)
Fracture/type	ante-mortem, distal radius, right, Salter-Harris (IV): CR
	ante-mortem, left Rib 7-8, projectile, embedded arrowhead: CR
	peri-mortem; humerus, 3 ribs; v-shaped grooves; no fibre bone
Other	possible "Short Root Anomaly"
Broad Category	nutritional deficiency; projectile wounds
Differential Diagnosis	intentional, lethal violence

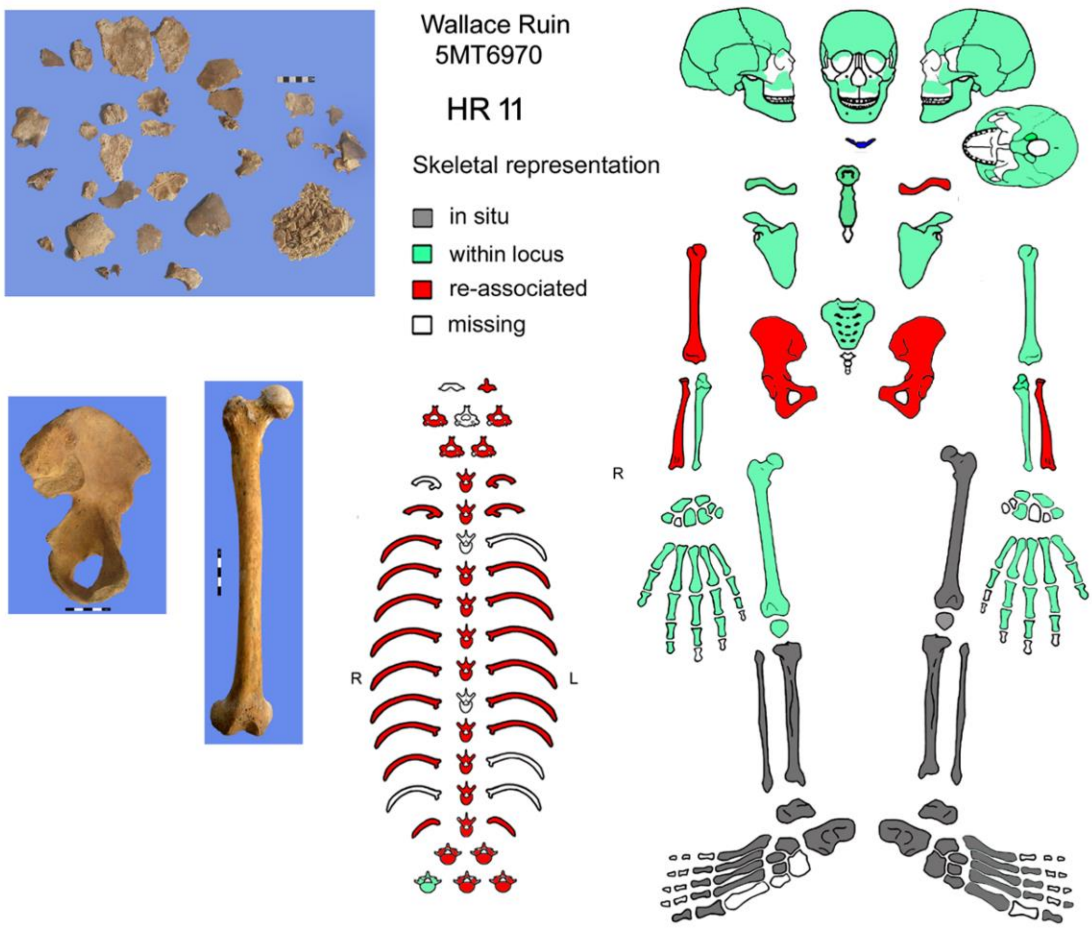


Fig. C.19: Photograph and schematic representation of HR 11 skeletal elements.

The skeletised remains of the adult male HR 11 were intentionally disturbed and displaced during the prehistoric period. Even so, other than a few small bones of the hands and feet, most skeletal elements are present and in good to excellent condition (Fig. C.19). Damp alkaline soil and root intrusion have damaged the cranium considerably; the sphenoids are disintegrated, as is the maxillary alveolar bone. However, vault bone surfaces are observable, as is the superior region of the right orbit.

Paleopathology

Four of the six observable indicators register a skeletal response to stress: enamel hypoplasia, dental caries, ectocranial porosis, and skeletal trauma. The slightly above average femoral length and skeletal robusticity attests to a good state of nutrition and health for most of this individual's life. Enamel hypoplasia occurs as a single, systemic response to stress that involved all four canines. These linear grooves and linear arrays of pits comprise the most pronounced (P)EH defects in P3WR teeth (Fig. C.20). The aetiological age of 3.0 to 3.5 years matches the MVR peak-age-at-stress. Potentially, the EP lesions developed during this 6-month interval. The EP lesions (Fig. C.21) consist of small patches of very well-healed, barely discernible porosity within the right orbit and on the posterior parietals; the left orbit is unobservable.

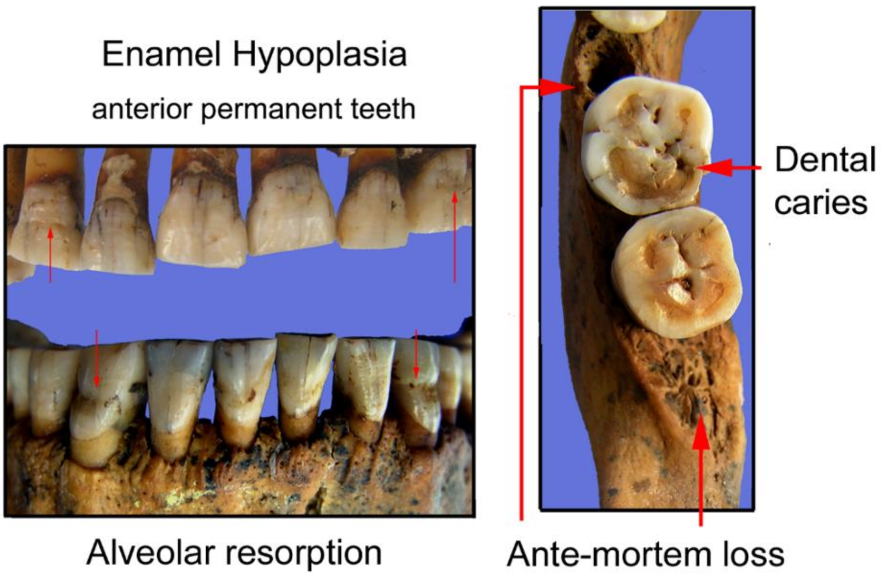


Figure C.20: Pathological conditions observed within or adjacent to the worn, permanent teeth of HR 11.

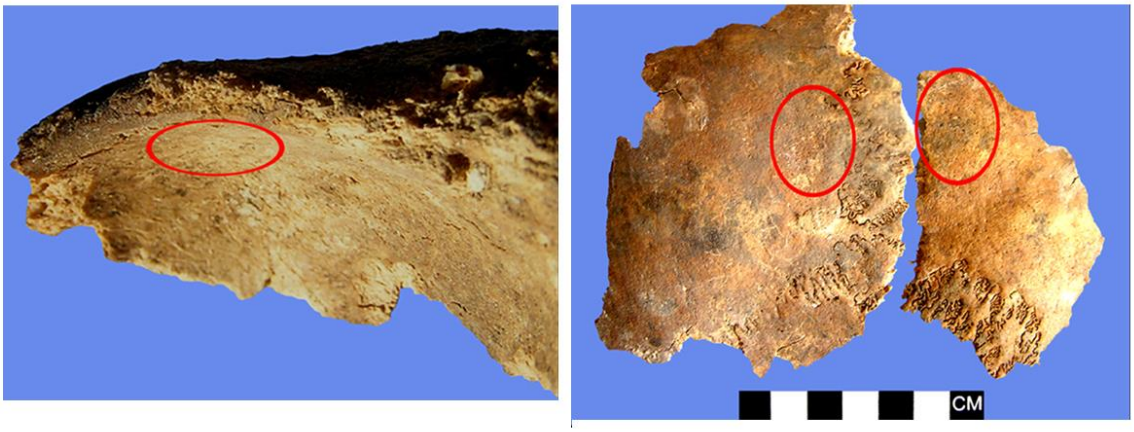


Fig. C.21: Photographs of locations of abnormal porotic bone in HR 11 cranial elements; all lesions are well-healed.

Of the three inherent conditions, only dental caries may have served as a potential source of physiological stress at the time of death. Each of the five cavities consists of a small occlusal surface pit. The left mandibular 1st molar contains the deepest cavity, as ascertained with a dental probe (Fig. C.20); it intrudes into dentin but it is unknown if it or any other pit invades the pulp cavity. There is no evidence of inflammatory responses (PR) that could be indicative of a bacterial infection. Also documented are oral pathologies acquired by HR 11 that are common in a cariogenic, maize-reliant diet: the resorption of alveolar marginal bone and the ante-mortem loss of the mandibular left 2nd premolar and 3rd molar.

The indicators of health and nutrition in the teeth and bones of HR 11 are both slight in expression and common in P3WR individuals and members of other Ancestral Pueblo communities. On the other hand, the pattern of skeletal trauma is distinctive. HR 11 has two ante-mortem fractures and is the only P3WR individual with peri-mortem damage that is attributable to human actions.

Ante-mortem Fracture

Although both ante-mortem fractures are healed, it is possible to place them in a chronological sequence. The earlier injury is a Salter-Harris Type IV fracture of the immature distal right radius (Fig. C.22). In mature remains, such a wrist injury would be classified as a Colles' fracture. This break traversed the distal diaphysis, the growth plate, and the distal epiphysis. The fracture of the diaphysis comprised a partial, green-stick fracture of the dorsal (posterior) surface. The damaged to the epiphysis involved a break that separated a region of bone on the volar (anterior) surface from the styloid process and the posterior rim. In the absence of radiography, it is difficult to say whether this damage comprised a complete or partial fracture. Several millimetres of bone separate each of these epiphyseal segments from the diaphysis, which together suggests that this injury disrupted the growth plate prior to partial union of the epiphysis. The morphological features of the distal radius are almost in anatomic position, apart from a small degree of posterior displacement. Developmental factors indicate that fracture occurred between 10 to 16 years of age. The epiphysis had attained its near-mature, rectangular configuration with a diagonal cut in one corner, which occurs by about age 10 (Scheuer and Black, 2004). The disruption of epiphyseal union indicates that the fracture occurred prior to about 16 years of age (Baker et al., 2005). However, even though this would have been a significant injury, it seems not to have had long-term consequences since the right humerus and scapula are more robust than their antimeres.

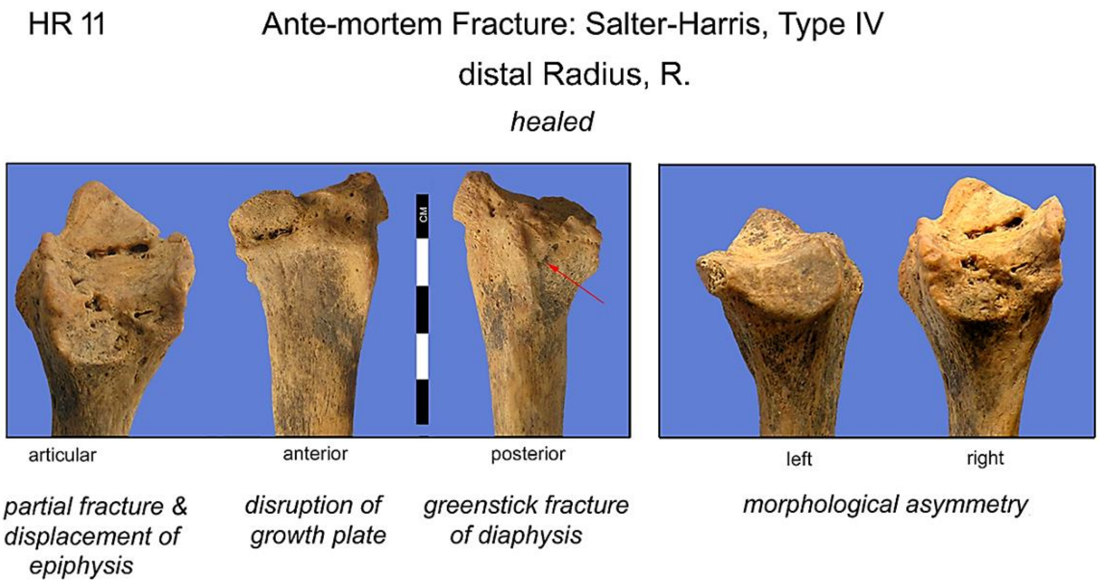


Fig. C.22: Photographs of the long-healed fracture of the right distal radius of HR 11.

The second healed fracture involves a projectile entry into the posterior surface of a complete left mid-thorax rib (7 or 8), just lateral to the angle (Fig. C.23). Due to the extensive post-depositional disturbance of the skeletised remains, it is not certain whether this is Rib 7 or Rib 8. If Rib 7, the scapula would have to be rotated superio-laterally by the elevation of the shoulder to allow exposure of this region of the rib. The tip of a small white quartzite arrowhead is embedded in the body of the rib. Some 2 mm of the point stands proud above the bone surface at a very oblique, superio-inferior angle. Remodelled bone deposits extend onto the surface of the point around most of its circumference. The ventral surface in the region of the point tip is undamaged; however, two short cracks traverse the area between the exposed point shaft and the ventral surface of the superior border. Each fracture is well-healed. Three small chips from this point are incorporated into remodelled bone deposits lying adjacent to the point stem. It is indeterminate if the distal end of the point was broken off at impact or during the attempt to extract the arrow. No PR lesions are present on this or any other rib, and the left scapula is also unaffected. Even though the bone is healed, the absence of an inflammatory response is surprising; the sharp edge of the broken tip would have continued to abrade the overlying soft tissue (m. serratus anterior, possibly m. rhomboidius major) during movement or use of the left arm.

The position and orientation of this arrowhead equates to a shot into the back from a position superior to the rib. If HR 11 was erect, the shot would have come from above; but, if his upper body was more parallel to the ground, so either prone or hunched over, it would imply a shot fired from a head-on position at ground level. Fractures of torso bones (clavicles, ribs and vertebrae) heal within a matter of weeks due to their higher rate of bone turnover, in contrast to the densely-structured long bones and os coxae (Martin et al., 2010:67). Although healed, these small cracks are still visible; thus, they are not yet indistinguishable from the original bone surface as eventually occurs in fracture remodelling (ibid.). Both of these factors, along with the accumulation of bone deposits upon the point stem, suggest that this injury occurred weeks or months, but not years, prior to death. Moreover, information provided in the section on peri-mortem damage provides compelling evidence that this projectile injury is associated with events that took place near the end of this individual’s life rather than concurrent with the wrist fracture when a youngster.

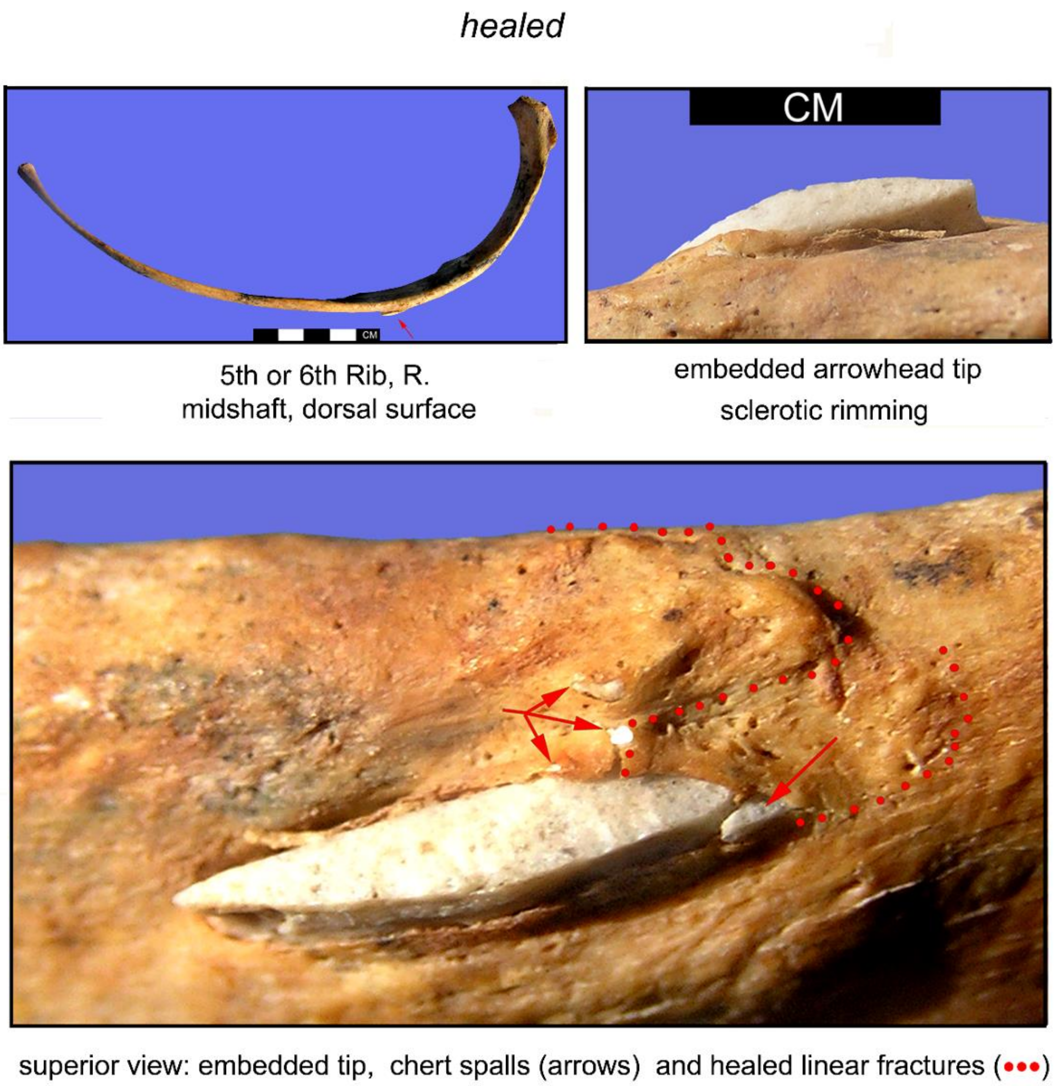


Fig. C.23: Embedded arrowhead in HR 11 rib, associated radiating fractures and bone remodelling (healed).

Peri-mortem Fractures

Two bones have a single, v-shaped groove of size and shape consistent with a sharp-edged projectile entry and two more bones have damage with similar, though less compelling fracture attributes (Fig. C.24). None displays any evidence of healing. The first such fracture consists of a narrow groove, or nick, located at the rib angle on the superior border of the 7th right rib. This groove angles medially and cuts through the width of the rib. The shape and width of the groove are consistent with a projectile entry from the rear. The second v-shaped groove is perpendicular to the long axis of the humerus. This deep groove cuts through the lateral supracondylar crest on the posterior surface of the right humerus. It is bordered by bone surfaces exposed by the removal of thin, shallow bone spalls; the uppermost ends in a hinge fracture. The width of each spall is identical to the width of the v-shaped groove, and the coloration of each exposed surface is consistent with the rest of the shaft. Neither of these thin slivers of bone was located during excavation, even though the burial pit contents were put through a sieve. The configuration of this groove is consistent with the shape and width of a projectile wound, with entry coming from the right. However, groove width is more consistent with a biface than an arrowhead; also, the fine linear but irregularly spaced striations the inferior margin may have been produced by biface facets positioned at different angles and depths (Alan Outram, pers. comm., 2015). Possibly, this is a chop injury inflicted with a stone axe.

Two more right ribs, of uncertain number other than 4-9, may have peri-mortem fractures involving a v-shaped groove. Each break is located on the inferior border near the rib midsection. Although each fracture has green-bone attributes, subsequent post-mortem damage makes their identifications as projectile entry fractures less secure. Assuming that these are arrow wounds, this post-mortem breakage precludes a conclusive determination of the location of the attacker in respect to HR 11.

Due to the complete disturbance and re-deposition of HR 11 by Ancestral Puebloans, it is not known if any of the arrowheads that were recovered in the disturbed soil deposits of the burial pit were actually within the body at deposition. The cuts through the ventral surfaces of each of these ribs means that, regardless of whether entry was anterior or posterior, these projectile entries may well have penetrated the thoracic cavity and thus the lungs. In his study of arrow wounds received by members of the US Calvary, Army Medical Doctor J. H. Bills (1892, in Ennis and Harrington, 2013) determined that such thoracic injuries were usually fatal. He reports that internal haemorrhage or emphysema (distention of the lung air spaces) could have fatal consequences within hours, though infection took several days to become established. Thus, although HR 11 may have succumbed immediately, the absence of new bone formation indicates that he died no more than 2-3 weeks after wounding.

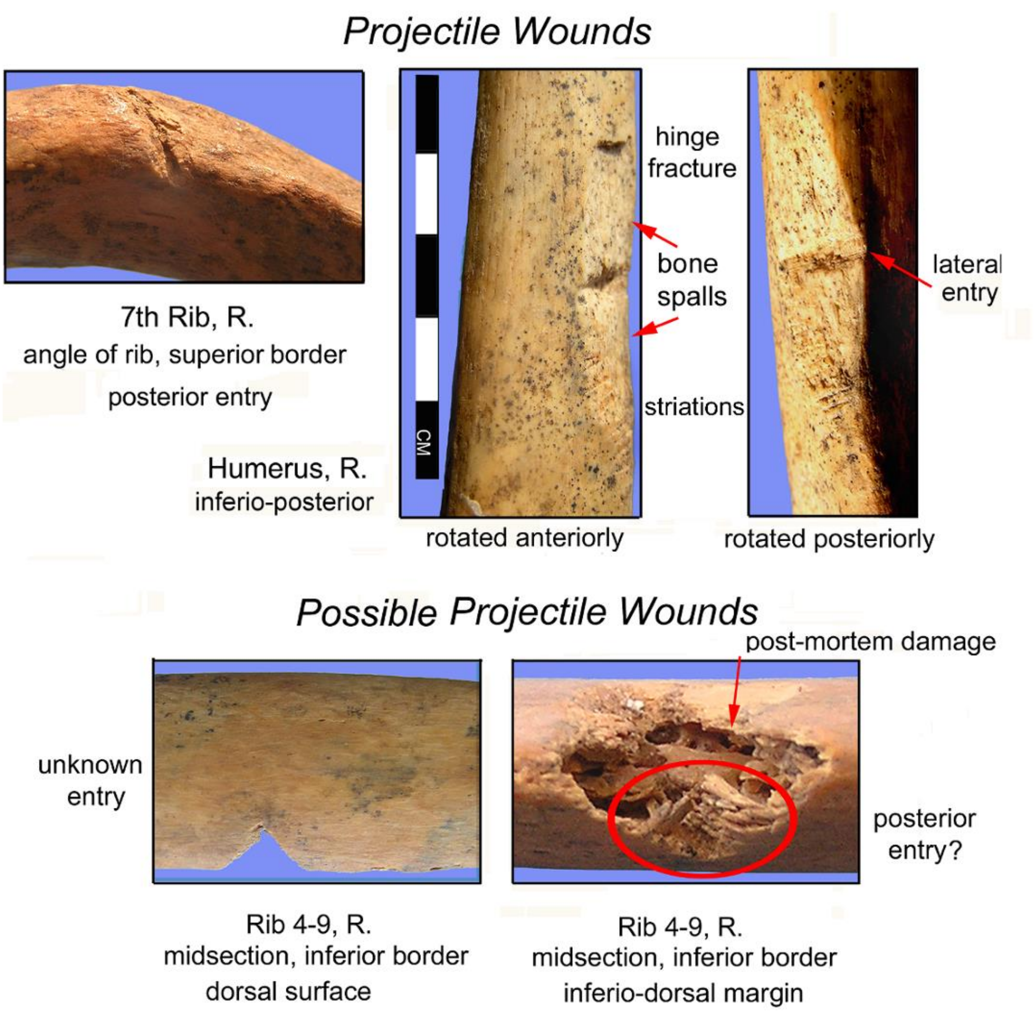
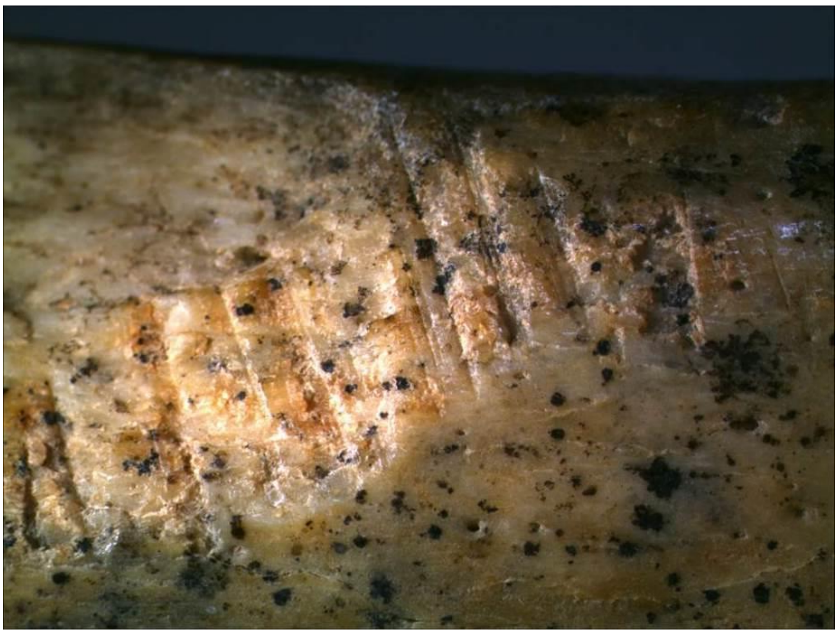


Fig. C.24: V-shaped groove injuries in HR 11 bones.

Striations: Right humerus, inferior region of wound



(Photograph by Sheahan Bestel)

Short Root Anomaly

Although the original crown height of the heavily-worn maxillary central incisors is indeterminate, the roots are blunted and may be abnormally short; based on an estimated original crown height, those of the HR 11 just slightly exceed the estimated crown height (Fig. C.25). In their discussion of the genetic condition Short Root Anomaly, Neto and colleagues (2013) note that, on average, root length is roughly 1.5 times crown height. They also advise that shortened tooth roots can result from a number of causes, including alveodental trauma after the completion of root growth; however, such cases are usually unilateral. The familial genetic condition known as Short Root Anomaly, or Rhizomicry (Shuurs, 2013:38) in which root length and crown height are nearly equivalent, is another possibility. The post-mortem damage and loss of the maxillary alveolar bone precludes observation of this region for ante-mortem trauma, however, tooth crowns, though quite worn, are intact and undamaged. On the other hand, a compelling case for SRA is made for HR 17.

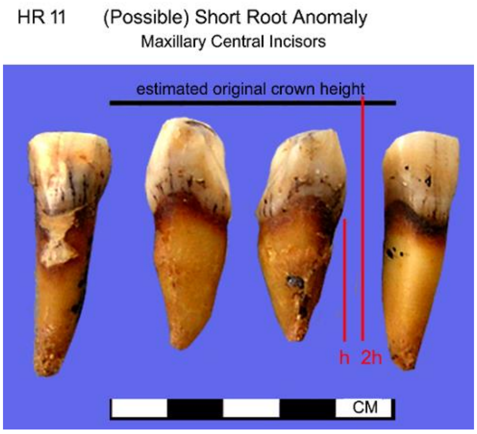


Fig.C.25: Possible short root anomaly in HR 11's maxillary central incisors.

HR 13

Individual Profile: HR 13	
Observability	
Skeletal representation	essentially complete
Bone condition	good
Surface preservation	fair
Other	in situ analysis; minimal lifting of bones
Demography	
Age	15 ± 3 y, dentition; 15-18 y, epiphyseal union
Sex	female; pelvic morphology; femoral head (37 mm)
Paleopathology	
Enamel hypoplasia (P)	systemic; 8/12 anterior teeth, 3.0-3.5, 3.5-4.0 y
Dental caries	absent
Ectocranial porosis	posterior parietals, occipital: CR/SL
Periosteal response	unobservable for slight deposits, but no gross lesions
Stunting	absent (FEM length: 39.7e cm); unfused distal epiphysis
Fracture/type	absent
Other	
Broad Category	nutritional deficiency
Differential Diagnosis	

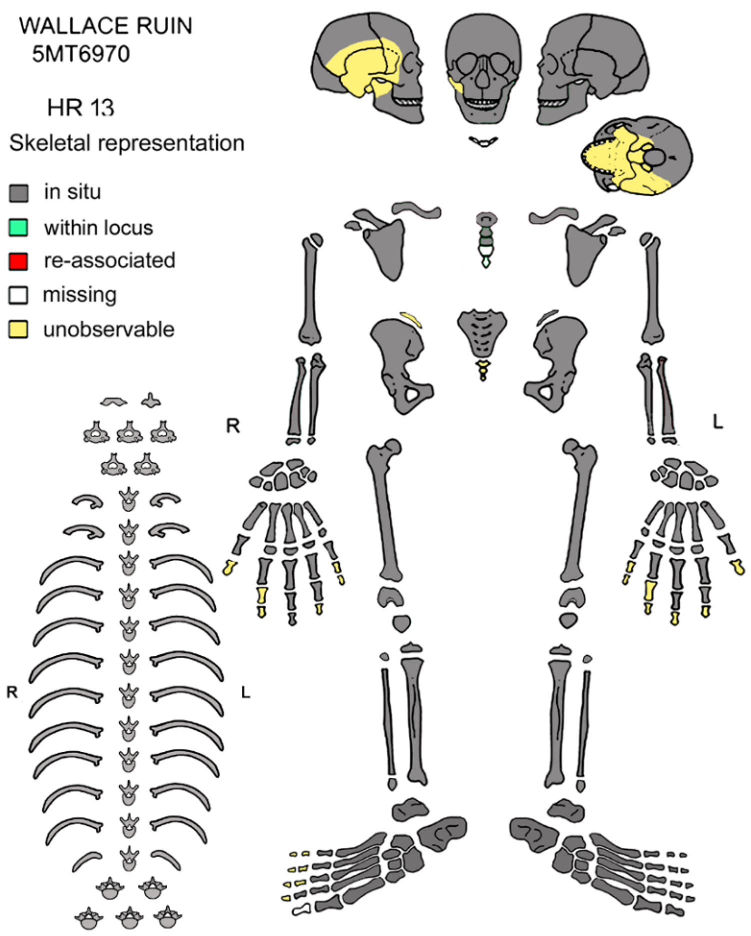


Fig. C.26: Schematic representation of HR 13 skeletal elements.

The older adolescent female HR 13 is the younger of two individuals deposited in the only indisputable double burial at Wallace Ruin. They were discovered during archaeological investigations in 1998 (Colorado State Permit # 98-57), following legislation introduced by the State of Colorado in 1990. Accordingly, their excavation and analysis followed protocols advised by the State Historical Society, which at that time strongly emphasised minimal lifting of skeletal elements and the re-covering of bones with associated soils within 48 hours of discovery. Although recording protocols follow Standards (1994) guidelines, photographic documentation is minimal due to these constraints.

HR 13 is represented by an almost complete skeleton (Fig. C.26). Most bones are intact apart from minor dry-bone damage. Bone surface preservation is only fair due to ground erosion and root damage, but there is no post-depositional disarray apart from minor displacements by intrusive plant roots. The few unobservable bones consist of those of the right cranium, which was not lifted for analysis, and phalanges; the latter are either missing or obscured.

Paleopathology Summary

Of the five fully observable indicators, a skeletal response to stress involves only enamel hypoplasia of the permanent teeth and ectocranial porosis. The cranium has no PR lesions, but surface preservation precludes the identification of slight responses. However, no extensive or severe lesions are present.

The orbits are clear of lesions, and neither sphenoid is observable for porotic responses. However, small (<3 cm) patches of well-healed porosities are present on the posterior surface of each parietal near mid-line and at the apex of the occipital. These patches contain pin-point porosities, but most of the pores are 1.5 to 2 mm in diameter. Diploic expansion is not observable in this intact cranium. It is not known if these pits represent a nutritional stress or a scalp condition; however, the symmetrical locations if the patches and the larger size of the pores is more suggestive of the former.

Enamel hypoplasia occurs as two systemic responses to stress. Of 20 observable teeth, such disruptions affect 8 of the 12 anterior teeth only. The first episode is the more severe as it involves five teeth comprising three tooth types and both arches. The aetiological age of 3.0 to 3.5 years matches the MVR peak-age-at-stress (Malville, 1997). A second stress response at 3.5 to 4.0 years affects the maxillary canines only. In addition, the maxillary right lateral incisor has a stress response with an aetiological age of 2.5-3.0 years. Considering the strictures of in situ analysis, observer error is a reasonable possibility in regard to measurement of defect from CEJ. If so, it may be that these three teeth were affected concurrently with the other anterior teeth. Even if not, then all of the P (EH) lesions developed during a one year (or less) time frame. Assuming that the EP lesions are a product of nutritional stress, it is possible that these EP and P(EH) lesions developed concurrently.

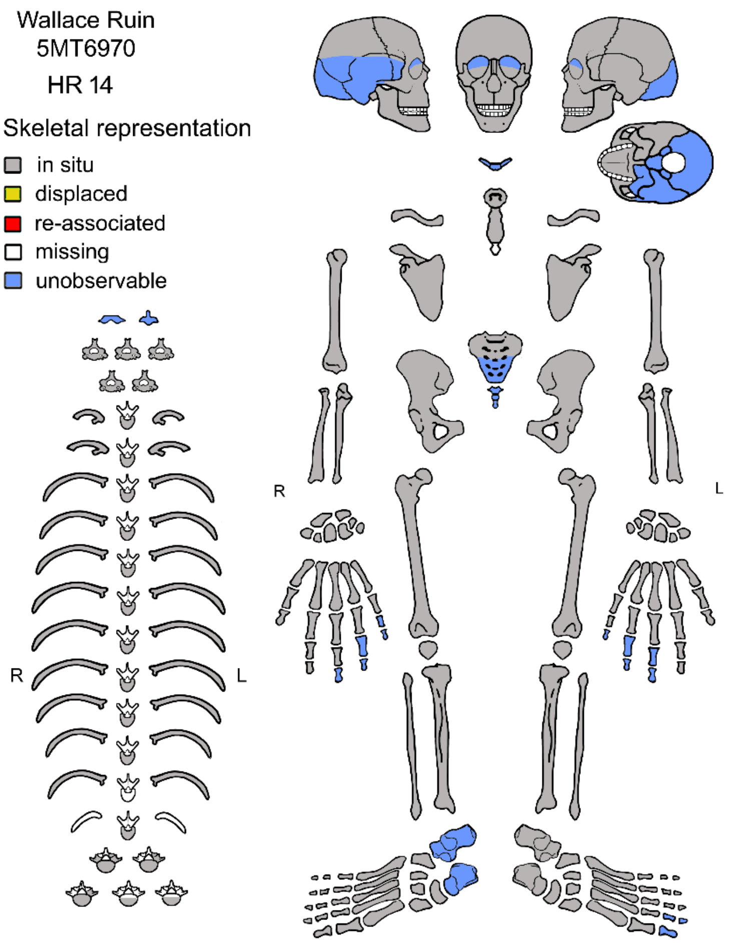
Despite this early bout of systemic stress, long bone measurements indicate that HR 13 had not experienced nutritional deficiency sufficient to disrupt longitudinal growth for extended periods of time, at least in comparison to the Point of Pines reference population. The maximum femoral length of 39.7 cm is a close estimate, obtained by the lifting and articulation of the left femur and its unfused distal epiphysis. This result is equivalent to the Point of Pines reference population for females. In addition, the maximum length of the tibia (33.5 cm) was measured in situ, with the unfused epiphysis in anatomic position. This result is just shy of the averaged female means (33.7 cm) and well within the 1st lower standard deviation (2.0 cm). Both of these results indicate that HR 13 had already attained the average long bone length of skeletally mature females at the time of death, with potential for significant longitudinal growth.

To summarise, HR 13 has few indicators of physiological stress, and none that were active or remodelling in the months or weeks prior to death. It thus seems that she succumbed to an acute condition before a skeletal response could occur. Whether this illness was shared with HR 14, or just coincident, is unknown.

HR 14

Individual Profile: HR 14

Observability	
Skeletal representation	almost complete
Bone condition	good
Surface preservation	good
Other	in situ analysis; minimal lifting of bones
Demography	
Age	50s; pubic symphysis; auricular surface; rib ends
Sex	female; pelvic morphology; FEM head (39.0 mm)
Paleopathology	
Enamel hypoplasia (P)	systemic, 3/11 anterior teeth; 3.0-3.5, 3.5-4.0 y
Dental caries	absent
Ectocranial porosis	cranial vault, absent; orbits, unobservable
Periosteal response	absent
Stunting	absent (FEM length: 42.3 cm)
Fracture/type	absent
Other	age-related osteoporosis?: light-weight femur slight osteoarthritis, lumbar vertebrae
Broad Category	
Differential Diagnosis	



C.27: Schematic representation of HR 14 skeletal elements.

The adult female HR 14 is the older of two individuals deposited in the only indisputable double burial at Wallace Ruin. HR 14 is represented by an almost complete skeleton (Fig. C.26); post-depositional disarray is scant. The right side of her body was nestled against the southern boundary of the subfloor pit. HR 14 was excavated in 1998 under the authority of State of Colorado Permit # 98-57. For reasons provided in the HR 13 case study, the cranium was not lifted during analysis; thus, its right and posterior regions were not observed. The few unobserved hand and foot bones are in locations obscured by overlying bones. Apart from disintegrated vertebral processes, most bones are intact apart from minor dry-bone damage. Bone surface preservation is generally good.

Age and Sex

HR 14 is in her 50s, based on concordance of pubic symphysis (Brooks and Suchey, 1990), auricular surface (Lovejoy et al., 1985) and rib end (Işcan and Steyn, 2013) development. She is the thus the only member of the P3WR14/18 individuals classified as an Old Adult (50+ y), in terms of *Standards* nomenclature (Buikstra and Ubelaker, 1994). Pelvic morphology is both definitely and consistently female. Osteometric sexing of the os coxae using the method of Murail and colleagues (2005) is not possible since the requisite measurements were not collected. However, the femoral maximum head diameter of just 39.0 mm is well below the 42.6 mm sectioning point derived from Point of Pines skeletal data.

Paleopathological Summary

HR 14 evidences just one of the six assessable indicators of stress. Of 21 observable permanent teeth, enamel crown disruptions affect 4 of the 11 anterior teeth only. According to Malville's (1997) chart, P(EH) occurred as two systemic responses at age 3.0 to 3.5 and 3.5 to 4.0 years. In each case, just two mandibular teeth were affected, though the mandibular left mandibular canine was involved in both episodes. The aetiological age of 3.0 to 3.5 years matches the MVR peak-age-at-stress (Malville, 1997). The maxillary left central incisor has a linear horizontal groove with an aetiological age of 2.5-3.0. Considering the strictures of in situ analysis, observer error is a reasonable possibility in regard to measurement of this defect from CEJ. If so, it may be that this enamel disruption also occurred during the 3.0-3.5 y interval. Dental attrition is severe (wear stage 6 to 8), so any earlier periods of stress would have been obliterated by the time of death.

HR 14 has complete alveolar resorption of six molar or premolar tooth sockets (5 mandibular), a circumstance indicating that these teeth were lost long before death. Although most of the remaining teeth have large expanses of dentin exposure, there are no carious lesions, calculus deposits, or observable abscesses.

Given her advanced age, the post-mortem damage to the orbits, and the conditions of in situ analysis, it is not surprising that no ectocranial porosity was observed since these porosities can remodel over time. Even so, nutritional deficiency was not problematic during longitudinal growth. The femoral length of 42.3 cm is well above average. This length is just at the threshold between the 1st and 2nd standard deviations (42.4 cm) of the Point of Pines (Bennett, 1973) reference population, and it is within the upper 2nd S.D. for Northern San Juan Region females (Malville, 2008).

However, when this femur was lifted for measurement, it was notably lighter in weight compared to that of the shorter, incompletely developed femur of HR 13. The condition of the long bones allowed close observation, and there is no abnormal porosity. Cortical thinning associated with post-menopausal hormone imbalance is a strong possibility, given her age and sex.

To summarise, HR 14 has no active or remodelling lesions or carious defects that developed in the months or weeks prior to death. Even the early episodes of systemic P(EH) are quite mild and insufficient to disrupt her above-average longitudinal growth. Although classed as an Old Adult, by *Standards* nomenclature, HR 14 is not so aged as to assume death from natural causes. More likely, she died from an acute infection or gastrointestinal complaint before a skeletal response could occur. Whether this illness was shared with HR 14, or just coincident, is unknown.

HR 17

Individual Profile: HR 17	
Observability	
Skeletal representation	almost complete
Bone condition	good
Surface preservation	poor to good
Other	bones lifted, cleaned and analyzed in field
Demography	
Age	15 ± 3 y, dentition; 15-18 y, epiphyseal union
Sex	probably female; ambiguous os coxae and cranium; flat sacrum, FEM head (37 mm)
Paleopathology	
Enamel hypoplasia (P)	systemic: 2.0-2.5 (3 anterior) and 2.5-3.0 y (5 anterior)
Dental caries	2 occlusal surface, small; maxillary and mandibular
Ectocranial porosis	orbits: CR/SL; parietals and R sphenoid: unobservable; occipital, L sphenoid, R temporal: absent
Periosteal response	absent
Stunting	absent (FEM length:38.9 cm); partial union, distal epiphysis
Fracture/type	ante-mortem: right parietal: shallow depression; CR/SL
Other	Short Root Anomaly (Rhizomicry)
Broad Category	nutritional deficiency
Differential Diagnosis	

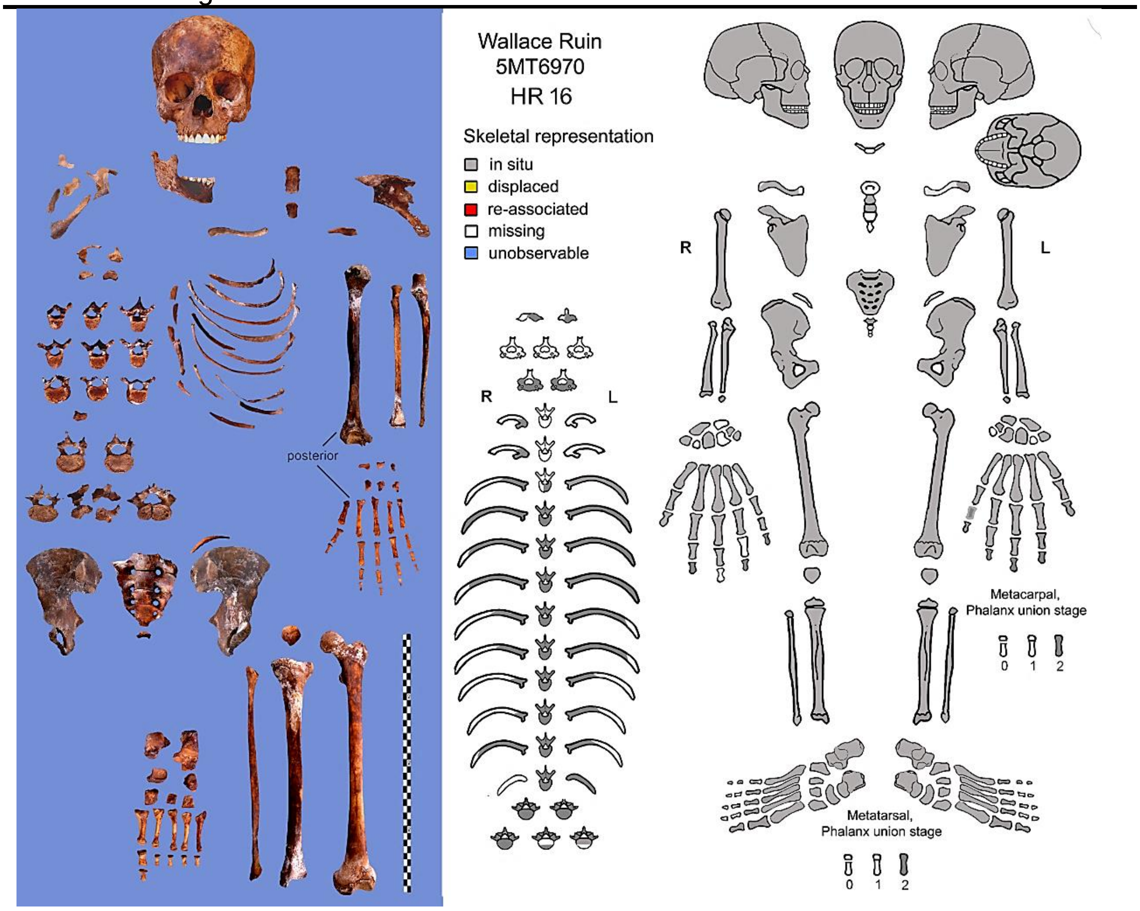


Fig. C.28: Photograph and schematic representation of HR 17 skeletal elements. Bones from left limbs not photographed.

The remains of older adolescent, probably female HR 17 were discovered in 2010 during excavation research conducted under the authority of Colorado State Archaeological Permit # 2010-86 (B. Bradley, 2010). In contrast to the more restrictive, in situ, protocols entailed during the analysis of HR 13 and HR 14 in 1998, the guidelines advised a decade later allowed the HR 17 bones to be lifted, washed, photographed and analysed at Wallace Ruin (in field analysis) prior to reburial before the completion field work. Due to time constraints imposed by a short field season, the right appendages are not photographed in detail.

HR 17 is represented by an almost complete skeleton (Fig. 7.28). Bone structures are largely intact but many surfaces are in poor to fair condition due to ground erosion in alkaline soil. Cranial vault bones are unobservable for PR and EP, apart from the well-preserved orbital region, the superior occipital, left sphenoid, and right temporal bones. Long bone mid-shafts are assessable for PR, but thick alkaline deposits obscure bone surfaces near the ends of many long bones. There is no post-depositional disarray apart from minor displacements by intrusive plant roots.

Age and Sex

Tooth eruption and the development of the maxillary third molar root provide a confident age estimate of 15 ± 3 years (Ubelaker, 1989: Fig.71). Long bone epiphyses are fusing or fused, which indicates that HR 17 is in the upper end of this age range (Scheuer and Black, 2004). Determination of sex using Phenice's (1969) criteria for pubic development is compromised by post-mortem damage. The flat morphology of the subpubic concavity indicates male but the hint of an ischiopubic ramus ridge suggests female. The ventral arc is not observable in either os coxae. The presence of unfused and incompletely fused os coxae epiphyses indicate that the pelvis was growing at the time of death and may not yet have attained its final, sexually dimorphic configuration. However, the moderately wide sciatic notch suggests a female, as does the flat sacrum. Osteometric sexing using measurements from the undamaged regions of the os coxae in accordance with Murail and colleagues (2005) is not possible since the requisite data were not collected during in field analysis. Compared to the Point of Pines reference population (Bennett, 1973: Tables 21, 23), the femoral head diameter of 37.0 mm is less than the Late Period female mean of 40 mm, and it substantially less than both the male mean of 48 mm and the 42.6 mm sectioning point. Although most of these various indicators suggest female, there is enough ambiguity to warrant a designation of probably female.

Paleopathology Summary

Although bone preservation hinders observational quality in several instances, all six skeletal indicators of stress were either completely (4) or incompletely assessable. The observed conditions consist of (permanent) enamel hypoplasia, dental caries ectocranial porosis, and ante-mortem trauma. Most manifestations are slight in expression and completely remodelled at the time of death. No stress markers lack any evidence of healing.

Most of the vault surfaces are unobservable for abnormal porosity, and diploic thickening is not observable in this intact cranium. The assessable right sphenoid, left temporal and superior occipital have no EP lesions, but porotic bone of slight appearance is observable in each orbit (Fig. C.29). The mostly pin-point pores of the right orbit are completely remodelled. All but a few lesions of the left orbit are healed; a very few, larger (2 mm) porosities are on the threshold of a designation of healed.

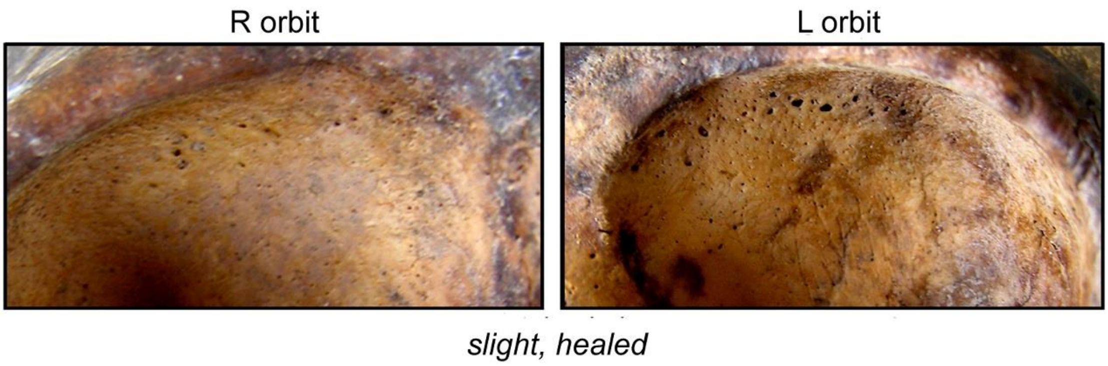


Fig. C.29: Slight, healed-healing abnormal porotic bone within each HR 17 orbit.

Possibly, all or most of these healed EP lesions developed during a period of physiological stress that affected teeth between two to three years of age. Though such age-at-stress responses are common, they are slightly younger than the MVR peak etiological age of 3.0 to 3.5 years age (Malville, 1997). Enamel hypoplasia affects 12 of the 16 observable anterior (8) and posterior (8) permanent teeth. HR 17 has a complete set of intact teeth, but three of the four canines and several cheek teeth are covered in an organic material that could not be removed during in-field analysis. Nine defects can be attributed to either of two systemic stress responses that occurred during two adjacent six-month intervals. It is unknown if these responses represent a single, rather mild but prolonged period of stress or two separate episodes. However, although both dental arches are involved in each instance, the left maxillary central incisor is the only tooth to develop a defect within both intervals. The first stress response at 2.0 to 2.5 years of age affected the left maxillary central incisor and each mandibular lateral incisor; the left mandibular first molar also has chronometric evidence of stress during this interval. The second, more intensive episode occurred during the next six-month interval (2.5-3.0 y), during which six of the eight observable anterior teeth developed a linear horizontal groove (5) or a non-linear array of pits (1); the posterior teeth are unaffected. A subsequent enamel disruption affected the mandibular left second molar at 4.0-4.5 years, but this non-systemic response could be related to a local trauma.

Although these episodes of stress occurred more than a decade prior to death, the somewhat short femoral length raises the possibility that HR 17 experienced some degree of nutritional inadequacy during the adolescent growth spurt. The assessment of stunting in HR 17 is problematic given that there is some uncertainty in the determination of sex. On the other hand, there is no firm evidence that this potentially still-growing individual was stunted. If female, the femoral length places HR 17 within the lower first standard deviation in comparison to the Point of Pines reference population for fully mature adult female femora. If male, then HR 17 is stunted since the femoral length is within the third SD below the mean for fully mature adult males. Even if so, there is linear growth potential since the long bone epiphyses are incompletely fused. An increase of just 0.5 cm would place “him” within the 2nd lower SD, which would mean that HR 17 is stunted by Malville’s (1997) definition but not stunted if using the more restrictive definition of Khan and colleagues (1996). It must also be kept in mind that even though the HR 17 femoral length is less than either reference population mean for fully mature individuals, the longitudinal growth of HR 17 in comparison to same-aged individuals is unknown.

The timing of the elongated (12 x 10 mm) depression fracture (Fig. 7.30) on the posterior parietal is indeterminate, although its well-healed appearance means that it did not occur in the weeks or months prior to death. This shallow wound is easier to detect by palpitation than by sight, though this is partly due to bone surface preservation. Nevertheless, the bone within this wound is only slightly degraded, and its texture is smooth and contains no pitting or ridging. Preservation within this area is sufficient to ascertain that there are no associated radiating cracks. The size and shape of this wound is consistent with the configuration of an Ancestral Pueblo digging stick (Martin et al., 2001:85).

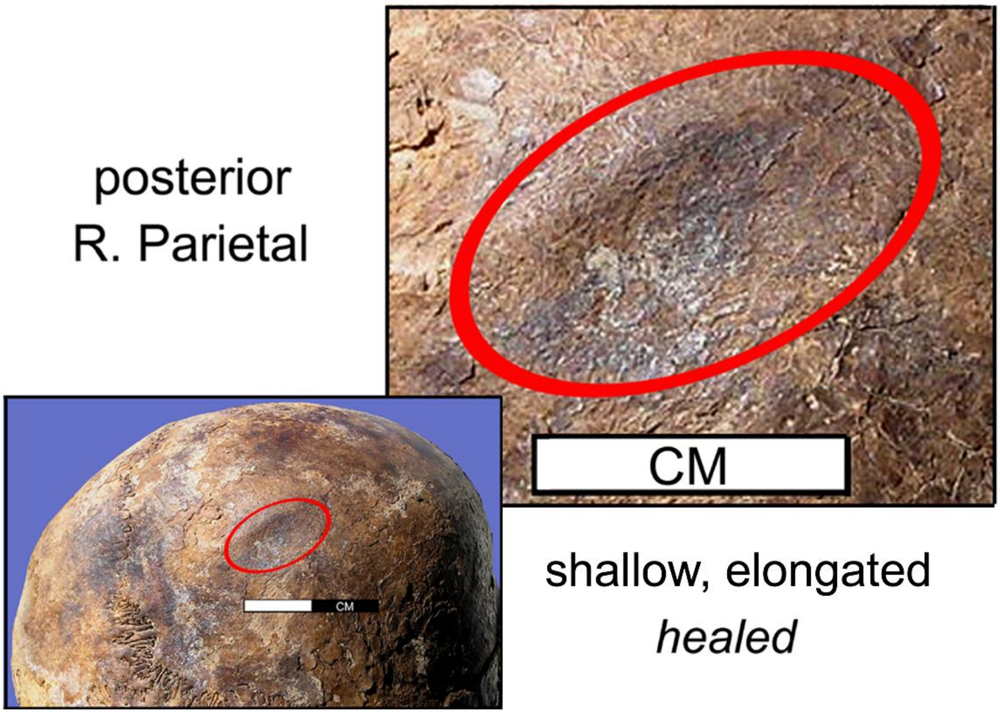


Fig. C.30: Healed elongated and shallow depression fracture on the posterior right parietal of HR 17.

Thus, in terms of pathological conditions, HR 17 seems to have experienced a mild to moderate period of physiological stress between two to three years of age. Possibly, some or all of the orbital porosities are associated with event. The advanced stage of healing precludes determination of whether these porosities represent diploic expansion or remodelled appositional bone, but there is no evidence of a scorbutic response in any other skeletal element. However, the sub-average stature suggests that nutritional insufficiency had an ongoing, if subclinical, detrimental effect on longitudinal growth.

HR 17 has two small occlusal surface cavities, but it is unknown if they intrude into the dentin (Fig.C.31). Even if so, the absence of PR lesions on long bone mid-shafts suggest that these defects did not provide a source of infectious stress at the time of death.

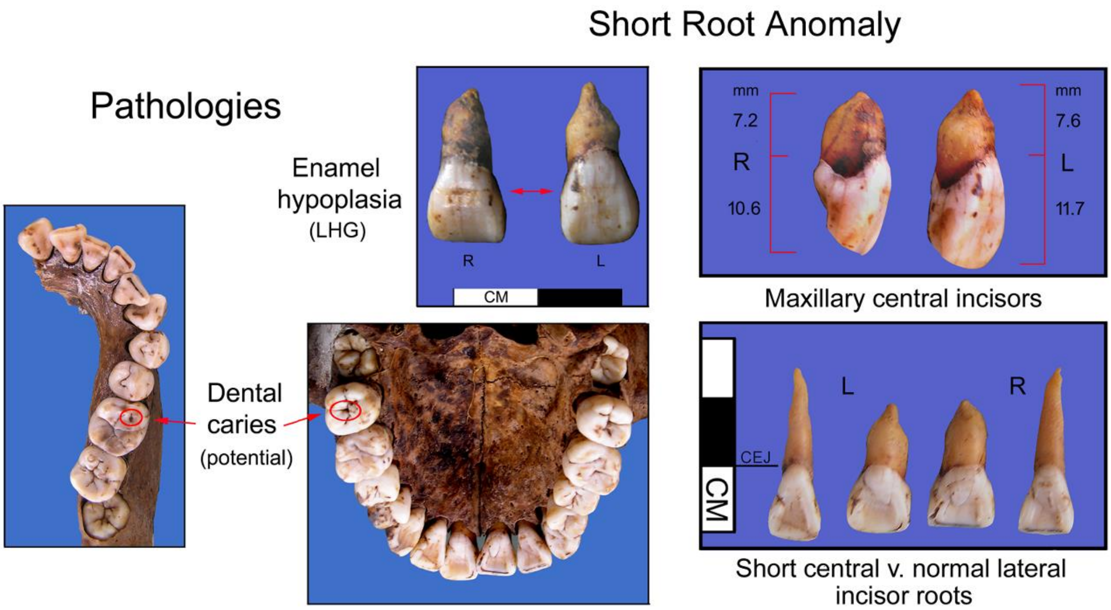


Fig. C.31: Pathological conditions in HR 17 teeth.

Other

Both maxillary central incisors have short, blunt roots compared to the normal crown: root ratio of 1.0:1.6 (Schuurs, 2013:38). There are very few unworn teeth from Wallace Ruin, and Malville (1994, 1997) does not report the mean crown heights used in her calculations. The crown height of the right incisor is quite worn, but the lightly worn crown height of the left incisor (11.7 mm) is consistent with the mean unworn crown heights from other Native American populations (Ritzman et al., 2008: Table 4). The HR 17 crown and root (7.6 mm) measurements constitute a ratio of 1.54:1.0, which is the inverse of the normal proportion.

Short Root Anomaly of the permanent teeth is a rare “constitutional” condition that primarily affects both maxillary central incisors, in which dental root length and crown height are approximately equivalent. Such bilateral rhizomicry (“short-rooted”) occurs as a heritable trait that runs in families, though the mode of inheritance has yet to be determined (Neto et al., 2013). Short dental roots can also occur in such disorders as *Dentinogenesis imperfecta* (Schurr, 2013:38), Rothman-Thompson Syndrome, and dwarfism (Roinioti and Stephanopoulos, 2007). In such cases, multiple tooth types are affected to varying, non-patterned, degrees. In addition, shortened roots can result from alveodental trauma (Trope, 2002). However, the shortening of mature roots of normal length is rare since they are resistant to resorption unless the protective pre-dentin or pre-cementum layers are damaged, thus enabling an inflammatory response of the tooth pulp or periodontium.

A differential diagnosis of Short Root Anomaly is the most plausible of these possibilities. Alveodental trauma can be excluded on the basis that there is no evidence of ante-mortem damage or periodontal abscesses in the anterior alveolar region. Bilateral responses to trauma are also unusual, especially if symmetrical as in the case of HR 17. Likewise, the normal enamel and morphology of each HR 17 tooth is not in keeping with *dentinogenesis imperfecta.* HR 17 may be slightly smaller than the average Ancestral Pueblo adult female, but the estimated stature of 147.9 cm (4'10") and proportionate long bone lengths are inconsistent with dwarfism. Stephens-Johnson Syndrome is unlikely as this severe, potentially life-threatening allergic reaction to an infection of the skin and mucous membranes tends to affect multiple teeth rather than just the central maxillary incisors (De Man, 1979). Likewise, the skeletal and dental symptoms of the Rothman-Thompson Syndrome are inconsistent with the evidence from HR 17; this genetic disorder produces skin rashes from infancy, skeletal abnormalities, short stature, and rhizomicry of all tooth types. Finally, indirect evidence for a familial genetic condition may be present in the central maxillary incisors of HR 11, which have an estimated 1:1 proportion of crown height to root length. For what it's worth, HR 11 and HR 17 are in cater-cornered rooms.

Individual Link 326

Individual Profile: Individual Link 326	
Observability	
Skeletal representation	partial; re-associated cranium, mandible, long bones, scapula, os coxae, cervical vertebrae
Bone condition	excellent
Surface preservation	excellent
Demography	
Age	15 ± 3 y, dentition; 15-18 y, epiphyseal union
Sex	female; pelvic morphology and dimensions; femoral head (36 mm)
Paleopathology	
Enamel hypoplasia (P)	anterior:unobservable; posterior: absent
Dental caries	2 occlusal surface, 1 large, 1 small
Ectocranial porosis	orbits, sphenoid, temporal: CR/SL; parietals: CR/MD
Periosteal response	localised, nasal; CR/SL
Stunting	absent (FEM length: 39.2 cm); partial union, distal epiphysis
Fracture/type	absent
Other	alveolar resorption
Broad Category	nutritional deficiency
Differential Diagnosis	scurvy

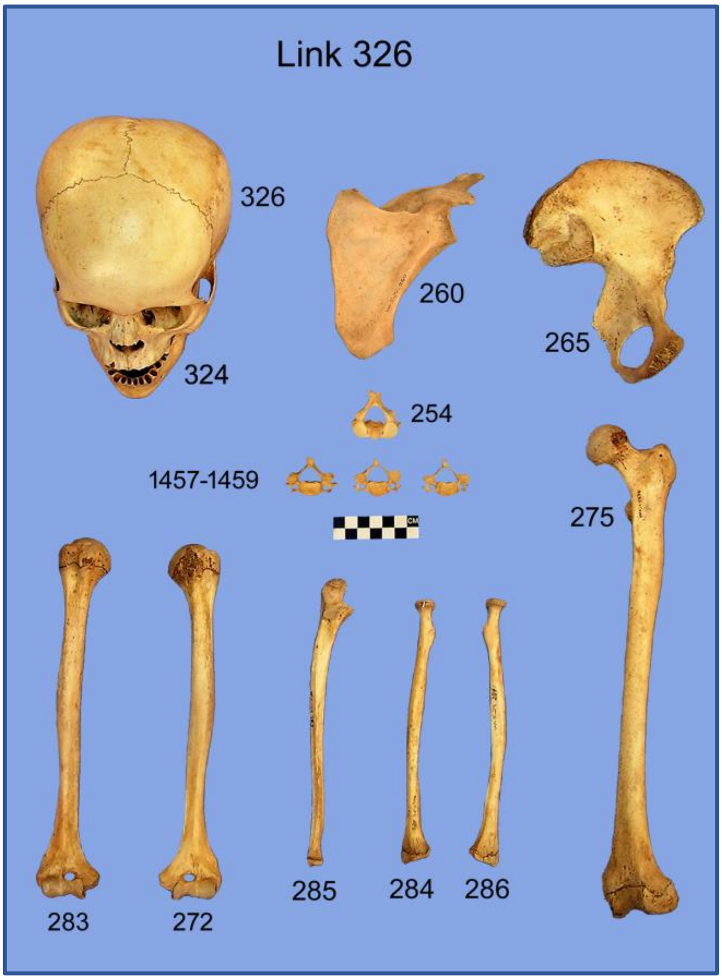


Fig. C.29: Photograph of bones assigned to Link 326 with high confidence

Individual Link 326 comprises several bones from an older adolescent female that were re-deposited in an approximate anatomic configuration by Ancestral Puebloans in Room 5a following canid disturbance of her primary deposition context. This unique Ancestral Puebloan re-depositional context, and the rationales for assignment of bones to this Link, is described in Chapter 11. The elements identified in Figure C.29 comprise the bones attributed to Link 326 with high confidence, though other torso and pedal bones located in Room 5a probably belong to her as well. Their near-pristine condition allows a high degree of confidence in observational accuracy.

Age and Sex

Tooth eruption and the development of the maxillary third molar root provide a confident age estimate of 15 ± 3 years (Ubelaker, 1989: Fig.71). Long bone epiphyses are fusing or fused, which indicates that Link 326 is in the upper end of this age range (Scheuer and Black, 2004). The presence of several vertebral epiphyseal rings indicates that Link 326 had entered puberty (Steele and Bramblett, 1988), the period in which the pelvis acquires its sexually dimorphic configuration. This individual is confidently diagnosed as female based on the concordance of results obtained by visual inspection of the subpubic region and osteometric sexing of the os coxae (Murail et al., 2005). Compared to the Point of Pines reference population (Bennett, 1973: Tables 21, 23), the femoral head diameter (36 mm) is substantially less than the Late Period female (40 mm) or male (48 mm) means, as well as the 42.6 mm sectioning point.

Paleopathological Summary

All six skeletal indicators of stress are assessable, though enamel hypoplasia is can be evaluated in posterior teeth only. Stress responses occur as dental caries, PR and EP. The EP and PR lesions are completely remodelled at the time of death.

The porous appearance of the bone along the maxillary alveolar margin is probably associated with mild alveolar resorption (Fig. C.30) rather than appositional bone. There are no dental abscesses. The post-mortem loss of all but one anterior tooth precludes evaluation of dental calculus but the posterior teeth are unaffected. Two of the eight (25%) assessable teeth have a carious lesion. The moderately large defect within the suture of the right 2nd mandibular molar intrudes into the dentin, but it is unknown if the small defect on the occlusal surface of its antimere is invasive as well. The larger of two may have been a source of bacterial infection; however, the bones from Link 326 display no evidence of systemic inflammation.

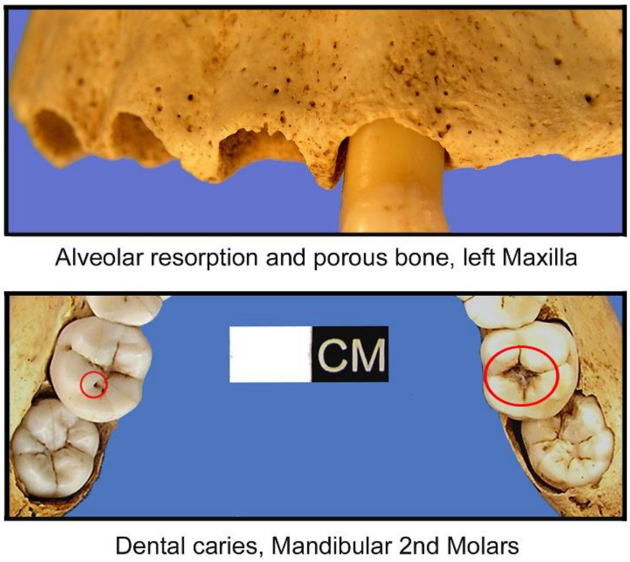


Fig. C.30: Photograph of the maxillary alveolar resorption and mandibular carious lesions of Link 326.

The only abnormal new bone consists of a small patch of remodelled bone on the inferio-lateral region of the left nasal bone; its antimere and adjacent maxillary process are unaffected (Fig.C.31). This inflammatory response could be associated with a localised infection or trauma to the overlying soft tissue; however, there is no evidence of skeletal fracture.

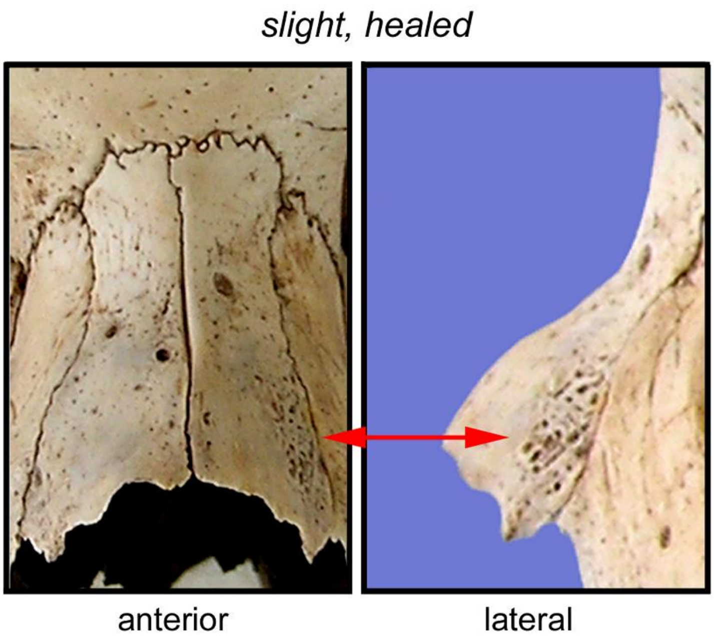


Fig. C.31: Healed, localised periosteal response on the left nasal of Link 326.

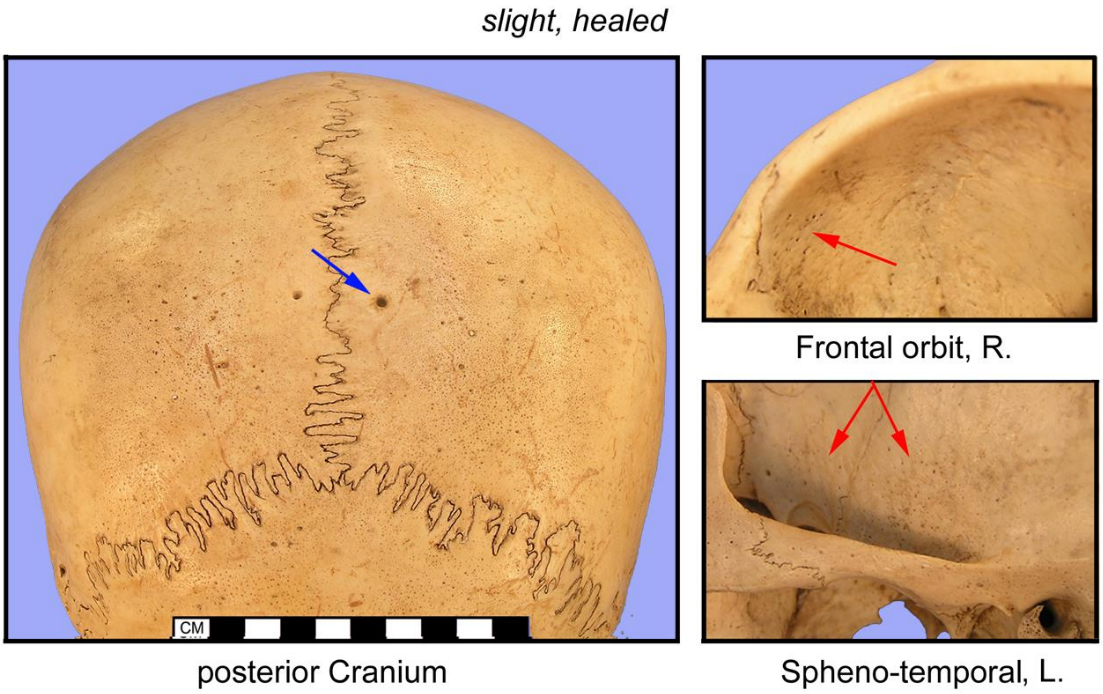


Fig. C.32: Healed abnormal porotic bone in cranial elements of Link 326. The blue arrow points to the large parietal foramen.

Practically every individual element of the Cranium 5.24.326 has well-healed abnormal porosities, as does its re-associated mandible (Fig. C.32). Diploic thickening is not observable in this intact cranium. The re-associated long bones, scapula and os coxae have no pathological bony responses. The EP within each orbit is barely discernible. A region of diffuse, pin-point to 1 mm diameter porosity extends across the posterior frontal, the entire length of each medial parietal and the superior occipital. The diameter of the right parietal foramen is some 20% greater than its antimere, but whether this represents a pathological response or a developmental asymmetry is unknown. Each sphenoid contains a scatter of healed pin-point to 1 mm pores, as does the left coronoid process of the mandible; the right coronoid process is unobservable. A diffuse scatter of 1 mm pores extends beyond the glabella region of the anterior frontal, which commonly has such porosities (Mann and Hunt, 2012: Fig.6). Finally, the slight porosity on each posterior maxilla may be a normal response to the development of the unerupted third molars rather than pathological.

Considering the multiple nutritional deficits of the typical maize-reliant Ancestral Pueblo diet, it is possible that some of the porotic responses may represent megoblastic anaemia. However, a differential diagnosis of scurvy can be made based on the presence of pitting in the spheno-temporal region and the mandibular condyle.

The advanced state of healing of all of the porotic lesions impedes determination of how the cranial vault porosities relate to the lesions that are diagnosable as scorbutic. They may represent separate episodes of stress occurring at quite separate times of life, involving either different or co-morbid conditions. However, it is clear that all porotic responses occurred well-before the time of death. A potential source of chronometric evidence from anterior tooth (P)EH is not available since all but three are missing post-mortem, and the three that represent possible re-associations have damaged crowns that are unsuitable for observation. However, none of the 10 assessable cheek teeth have enamel hypoplasia.

Long bone measurements indicate that Link 326 did not experience nutritional deficiency sufficient to disrupt longitudinal growth for extended periods of time, at least in comparison to the Point of Pines reference population. Femoral length is determined from a bone with an incompletely fused distal epiphysis. The maximum length of 39.2 cm is within the lower 1st standard deviation, which indicates that she had already attained average longitudinal growth, with perhaps additional growth potential.

To summarise, Individual Link 326 had no active or healing skeletal responses at the time of death. A diagnosis of scurvy can be made based on the presence of pitting within the spheno-temporal region. However, this pitting affects a relatively small area. Their healed status indicates that this individual was well beyond the convalescent period, when scorbutic lesions develop. These factors, along with the absence of pitting in post-cranial elements, suggest a relatively mild episode Vitamin C deficiency. Although there is evidence of slight to moderate nutritional stress at some point during her life, her average femoral length suggests that it did not affect her unduly or at least during periods of growth. The likelihood is that Link 326 succumbed to an acute condition before a skeletal response could occur. The degree of healing of the nasal PR is less advanced than the porotic responses, which suggests a subsequent inflammatory response. Even so, its remodelled appearance suggests that it is unrelated to the cause of death.

Individual Link 835

Individual Profile: Individual Link 835	
Observability	
Skeletal representation	incomplete
Bone condition	good
Surface preservation	good
Demography	
Age	6 ± 2 y, dentition
Sex	undetermined due to age
Paleopathology	
Enamel hypoplasia (P)	anterior teeth, unobservable; 1st molars, absent
Dental caries	absent
Ectocranial porosis	left orbit, parietals: CR/SL
Periosteal response	temporals, hemi-maxillae: MX/SL; fibulae: CR, MX/SL
Stunting	absent (FEM diaphyseal length: 231 mm)
Fracture/type	peri-mortem; canid toothmarks and gnawing
Other	developmental remodelling of alveolar margins
Broad Category	nutritional deficiency
Differential Diagnosis	

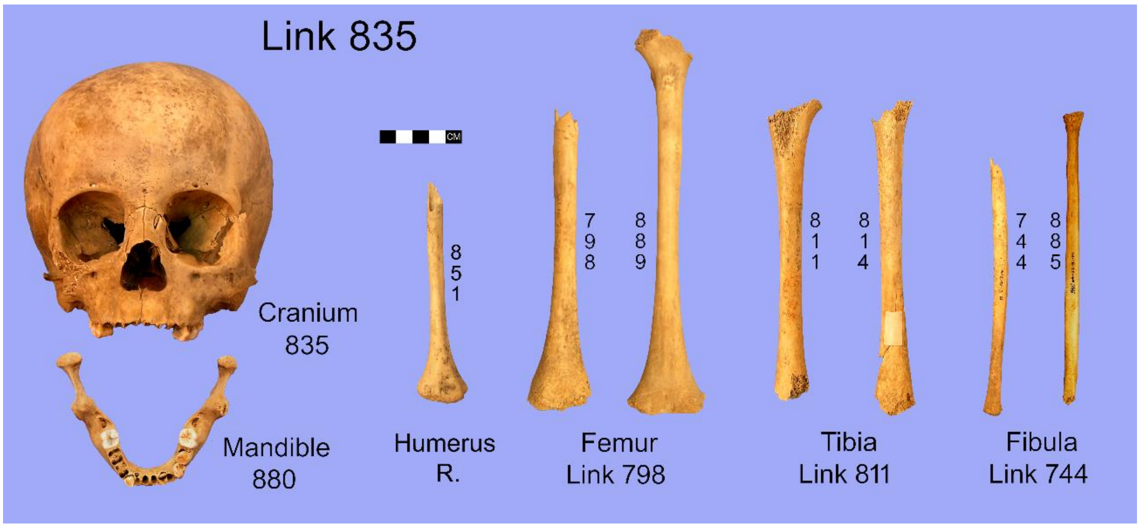


Fig. C.33: Skeletal elements allocated to Individual Link 835; long bones are consistently slightly shorter than those assigned to iLink 836. Mandible matches well to both crania.

Paleopathological Summary

Five of the six skeletal indicators are fully observable in Link 835. Assessment of enamel hypoplasia of the permanent teeth is limited to the two maxillary 1st molars. All of the permanent anterior teeth are in crypt and unobservable for LEH. A large pit is located on the left deciduous maxillary canine but the eight remaining deciduous teeth are unaffected. Remodelling alveolar bone along each hemi-maxilla may be, to some extent, associated with developmental processes occurring during tooth development and eruption rather than a pathological condition. All but two of the deciduous anterior teeth are missing, but some tooth loss is not unexpected in a child of this age.

Paleopathological responses are limited to ectocranial porosity (Fig. C.34) and periosteal responses (Fig C.35). All manifestations are slight in expression and either healed or healing. Ectocranial porosity (EP) consists of well-healed, pin-point pores located within the left frontal orbit and a region of fine porosity in the vicinity of lambda. The sphenoids are clear of porotic lesions. Diploic expansion is not assessable in this intact cranium.

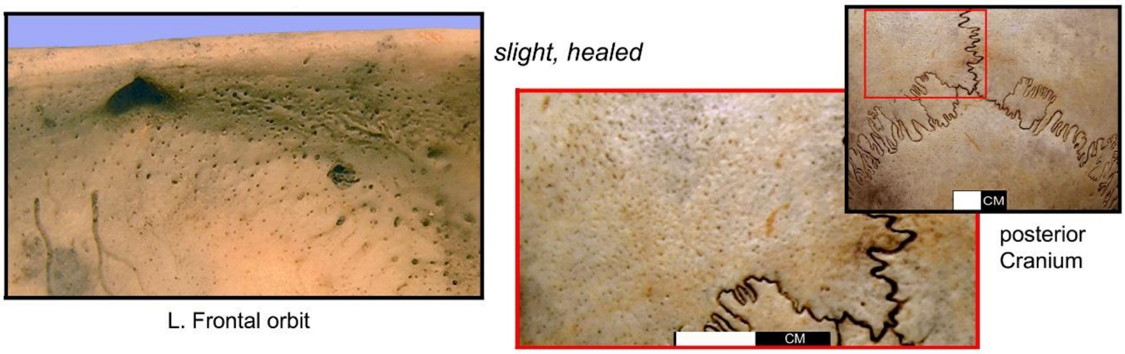


Fig. C.34: The slight and healed porotic bone responses of Cranium 835.

Each temporal bone, hemi-maxilla and fibula has PR lesions of slight appearance, though only those of the fibula are completely healed. A thin layer of remodelling appositional bone follows the curvilinear posterior-inferior insertion for the *Temporalis* muscle on each posterior temporal bone, adjacent the external auditory meatus. A small patch of remodelling appositional bone is located on the alveolar margin of each (unfused) hemi-maxilla in the region of the deciduous molars. Based on the age estimate, this anatomic region would not have been involved in developmental remodelling. The slight PR deposits on the mid-shaft of each fibula are healed, though they had not become integrated into the cortical bone by the time of death. The actual extent of the PR on the incomplete left fibula (744) is indeterminate due to post-depositional loss of bone.

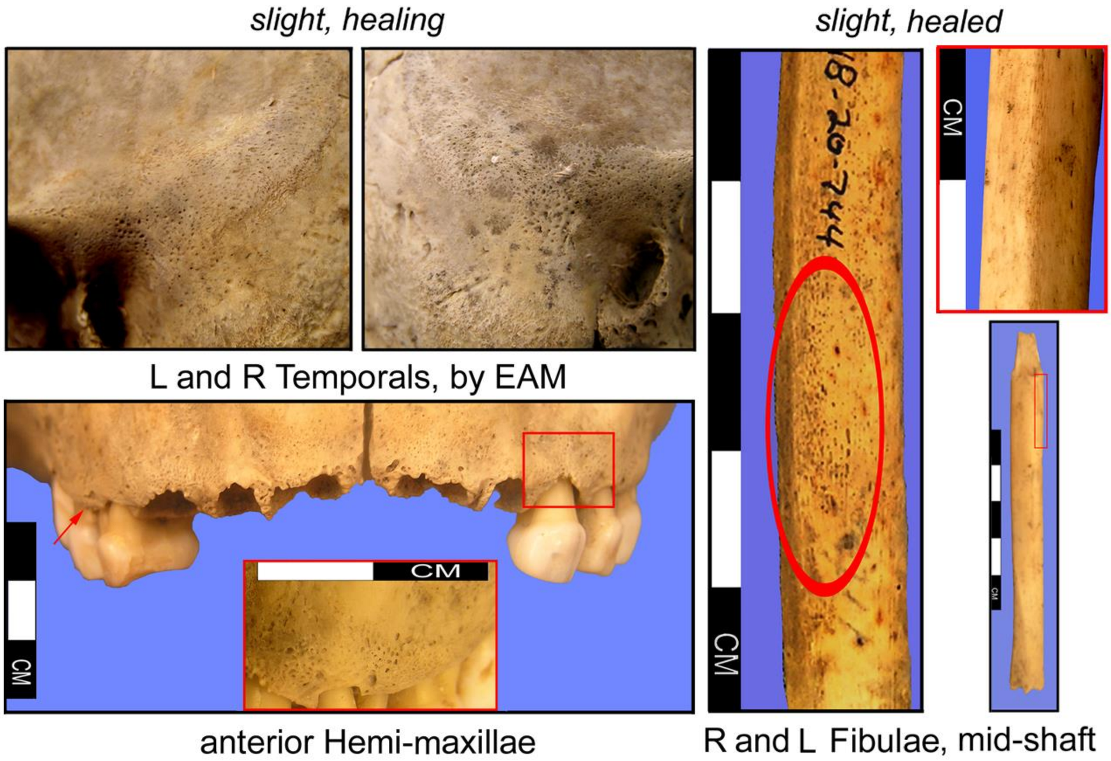


Fig. C.35: Appositional deposits on cranial and infra-cranial elements of Link 835. All responses are slight in expression and healing or healed.

To summarise, differences in healing status indicate that Link 835 experienced at least two episodes of a mild systemic stress. One episode may have involved nutritional deficiency whereas one or two periods of stress involve an inflammatory reaction. The healed EP lesions and fibular PR may involve a co-morbid condition, but the cranial PR post-dates their development. The vault EP could represent the response to megablastic anaemia, scurvy or a scalp condition. On the other hand, the absence of lesions in the right orbit is more suggestive of a local inflammatory response rather than marrow hyperexpansion. Even if the cranial EP is associated with a nutritional deficiency, it was insufficient to disrupt longitudinal growth unduly. The Link 835 femoral length of 222 mm matches the mean for same-aged individuals from Grasshopper Pueblo.

The bilateral occurrence of PR in each of the affected skeletal elements is consistent with a systemic inflammatory response. The occurrence of symmetric PR in two skeletal regions would suggest a more significant infection, if they shared the same healing status. However, even though the fibular lesions are healed, the manifestations are so slight that they may have simply remodelled more quickly than the cranial lesions. Potentially, the healed cranial EP and fibular PR developed concurrently but prior to the cranial PR.

Considering the proximity to the EAM and the young age of this child, it is possible that the temporal lesions represent an inflammatory response to ear infections. Although such infections can involve a localised response, a systemic reaction to a bacterial infection can occur in more severe cases (Lewis, 2007).

The maxillary and temporal formations could involve responses to the same systemic infection, but another possibility is that maxillary PR is instead produced by gingivitis. This condition occurs in cases of poor oral health, often in association with a cariogenic diet, or due to Vitamin C deficiency (Brickley, 2008). In addition, the breakdown of apical ligaments during a scorbutic episode can result in the loosening or loss of teeth (Brickley, 2008). Other than the re-associated right deciduous mandibular canine, no loose deciduous teeth were recovered in Structure 18. However, given the extensive disturbance by canids and the significant movement of even large bones by burrowing animals, the absence of multiple deciduous anterior teeth does not imply that all or most of them were lost prior to death. The unilateral occurrence of porous bone in the left orbit may represent an inflammatory response to haemorrhage, but there is insufficient evidence otherwise to support a differential diagnosis of scurvy. The posterior-inferior insertion for the Temporalis muscle has not been identified as a landmark associated with a scorbutic response (Brickley and Ives, 2006; Brown and Ortner, 2011; Geber and Murphy, 2012).

Individual Link 836

Individual Profile: Individual Link 836	
Observability	
Skeletal representation	incomplete
Bone condition	good
Surface preservation	good
Demography	
Age	6 ± 2 y, dentition
Sex	undetermined due to age
Paleopathology	
Enamel hypoplasia (P)	anterior teeth, unobservable; 1st molars, absent
Dental caries	absent
Ectocranial porosis	left orbit, parietals:CR/SL
Periosteal response	temporals, hemi-maxillae: MX/SL; fibulae: CR, MX/SL
Stunting	absent (FEM diaphyseal length: 231 mm)
Fracture/type	peri-mortem; canid toothmarks and gnawing
Other	developmental remodelling of alveolar margins
Broad Category	nutritional deficiency
Differential Diagnosis	

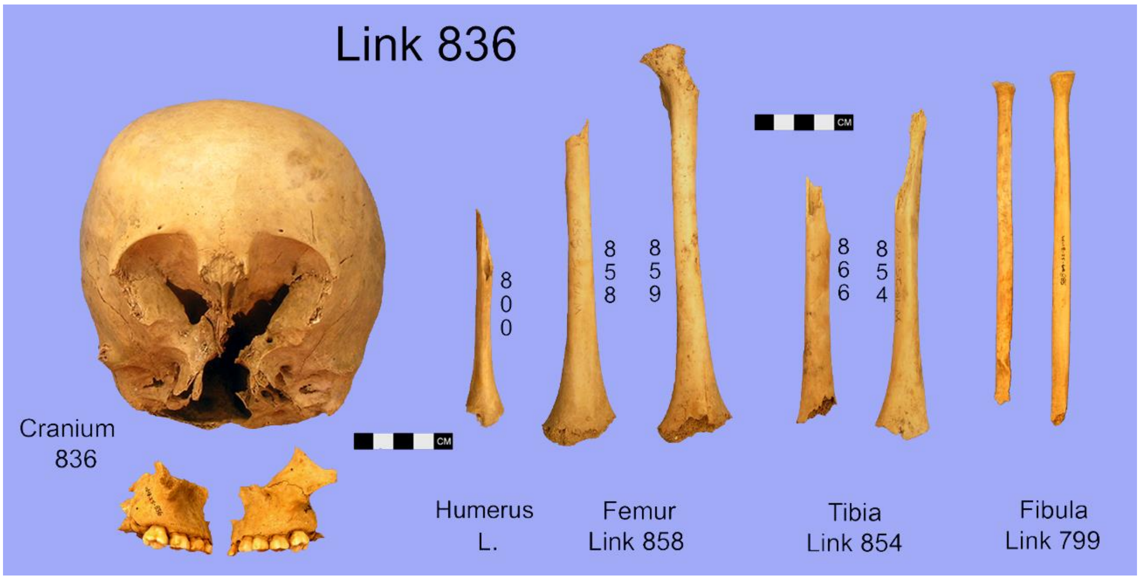


Fig. C.36: Skeletal elements allocated to Individual Link 836; long bones are consistently slightly longer than those assigned to iLink 836. Mandible matches well to both crania.

Although post-mortem processes have separated the hemi-maxillae from the otherwise intact cranial vault, the cranium of Link 836 is suitable for assessment of a range of pathological conditions, as are the mid-shafts of all seven long bones. In several cases, the identification of porosity beyond the cutback zones is precluded due to the peri-mortem damage inflicted by scavenging canids.

Paleopathology Summary

Five of the six skeletal indicators are fully observable in Link 836. Assessment of enamel hypoplasia of the permanent teeth is limited to the two maxillary 1st molars. All of the permanent anterior teeth are in crypt and unobservable for LEH. None of the three deciduous anterior teeth (canines, left central incisor) or the four deciduous molars have enamel defects.

Stress responses occur as ectocranial porosity and periosteal responses. Healed pin-point to 1 mm pores extend across each orbit. Similar responses occur within a small 2-3 cm patch near each parietal boss (Fig. C.37). The occurrence of diploic expansion is not assessable in this intact cranium. Periosteal responses affect two skeletal regions (Fig. C.38). A slight, sheath-like deposit of appositional bone extends along the alveolar margins of each hemi-maxillae in the region of the permanent 1st molars and deciduous molars. The deposits adjacent to the long-erupted deciduous molars are not associated with the normal sequence of tooth loss and eruption. These lesions do not extend across the anterior alveolar surface. However, it may be that such reactions are obscured by the alveolar remodelling associated with dental development in a child of this age. The formations of the left fibula involve a concentration of healing lesions on the anterio-lateral surface at mid-shaft. This response may represent a response to a traumatic injury since neither its antimere nor any other long bones have PR.

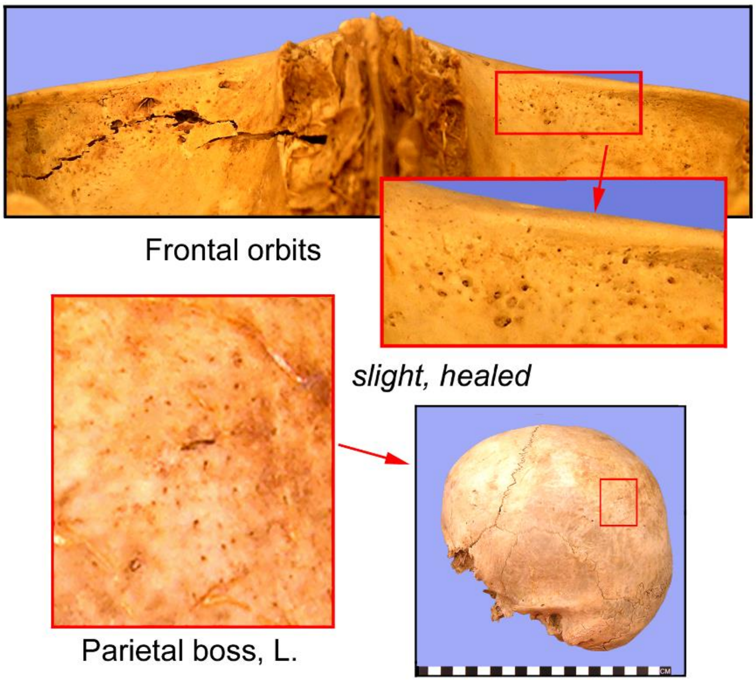


Fig. C. 37: Porotic responses on the cranium of iLink 836.

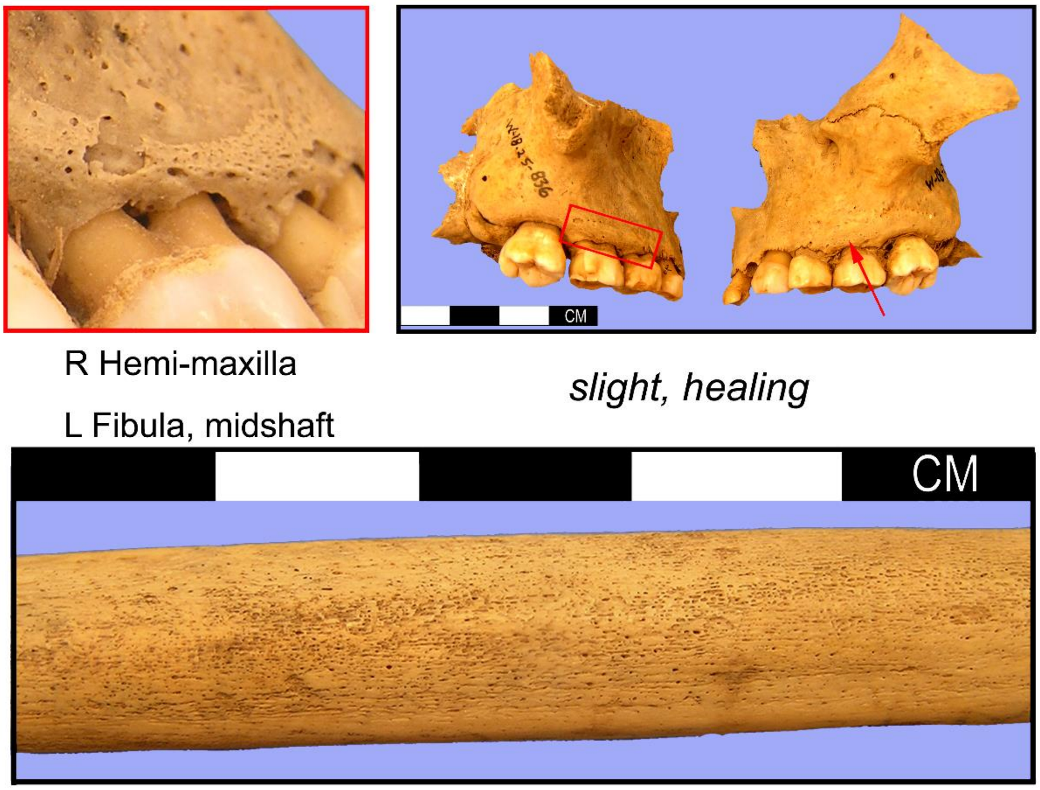


Fig. C.38: Periosteal responses on iLink 836 skeletal elements.

To summarise, the skeletal elements assigned to Link 836 evidence stress responses that are slight in appearance and which were either healed or he healing by the time of death. Without light microscopy, it is not possible to confirm whether the orbital lesions represent marrow expansion or an inflammatory response to haemorrhage (Schultz, 2003). Either way, the cranial EP is suggestive of a mild nutritional stress. The possible reasons for a PR response along the lateral alveolar regions have been previously described in the Link 835 case study. Vitamin C deficiency can prompt such a response (Brickley, 2008), but the Link 836 bones do not have lesions in regions considered diagnostic of scurvy. Although the fibular PR is incompletely healed, extensive remodelling had occurred by the time of death. The maximum length of the femur (222 mm) matches that of the mean femoral length of same-aged children from Grasshopper Pueblo, which suggests that this child was not unduly affected by nutritional insufficiency in comparison to other Ancestral Pueblo children.

The inability to assess enamel hypoplasia in the permanent dentition means that these data cannot be used to correlate potential defects with the aetiological age of the cranial EP. However, the healed appearance of all porotic responses suggests that the underlying nutritional stress occurred at least some months prior to death. They are definitely not concurrent with the healing periosteal responses of the hemi-maxillae and the single long bone. Although a systemic stress involving these two regions cannot be ruled out, the more likely explanation is that they represent different underlying conditions that developed some weeks prior to death. Considering their slight appearance and that each response shows significant healing, it appears that none of these inflammatory responses are directly related to the cause of death. The PR of Mandible 880 is less remodelled than any of the Link 836 PR lesions, but it, too, represents a very mild localised inflammatory reaction even if it does belong to this child. Thus, the probability is that Link 836 succumbed to an acute condition before a skeletal response could develop.

Link 867

Individual Profile: Individual Link 867

Observability	
Skeletal representation	incomplete
Bone condition	good
Surface preservation	good
Demography	
Age	20's; pubic symphysis, auricular surface
Sex	female; pelvic morphology and dimensions; FEM head (37 mm)
Paleopathology	
Enamel hypoplasia (P)	systemic; 3/7 anterior; 3.0-3.5 y
Dental caries	absent
Ectocranial porosis	orbits, vault, sphenoid, temporals: CR/SL
Periosteal response	alveolar region of the maxilla: CR/SL
Stunting	absent (FEM length: 39.1 cm; stature:148 cm)
Fracture/type	peri-mortem; canid tooth punctures and gnawing
Other	alveolar resorption, slight
Broad Category	nutritional deficiency
Differential Diagnosis	scurvy

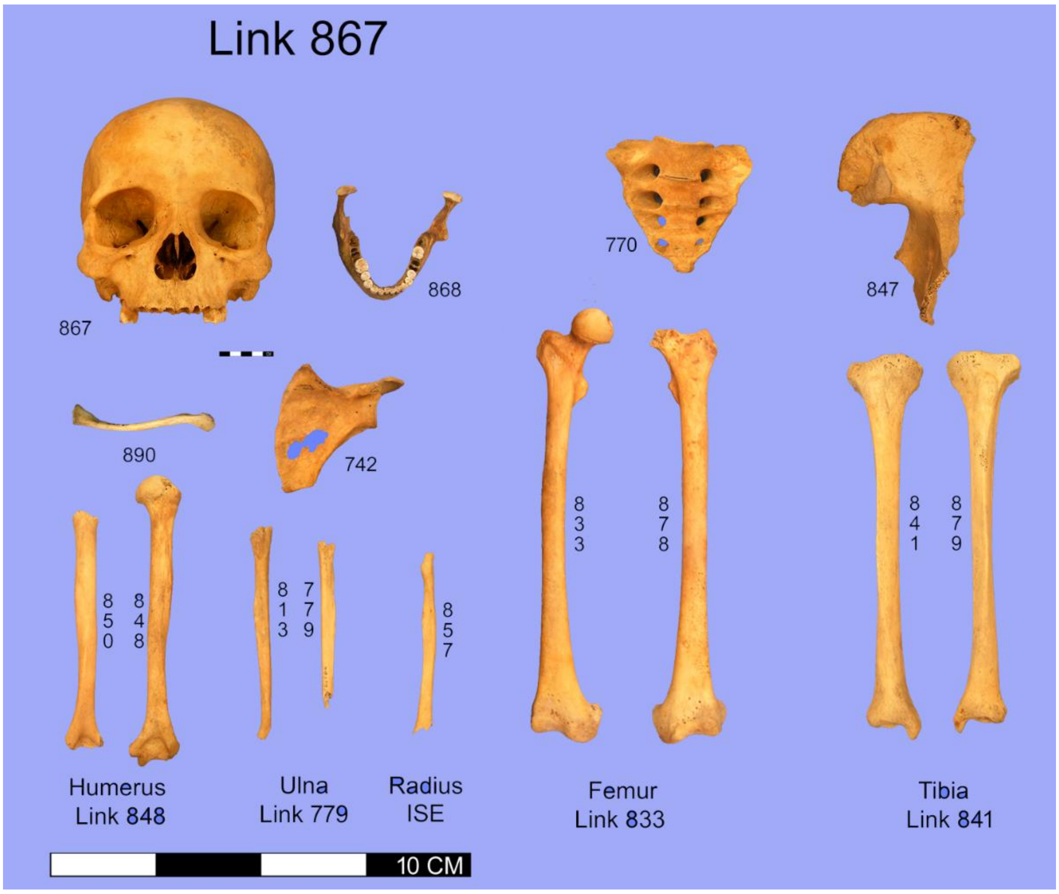


Fig. C.39: Photograph of selected re-associated skeletal elements to Link 867, including pair-match Links.

Link 837 consists of the major torso and long bones from a gracile, young adult female that were dispersed across Surf 2 of Room 18a (Fig. C.39). Differences in skeletal robusticity and closeness of fit of articulating elements allows the reliable segregation of Link 867 bones from a few major bones from at least one older adolescent and/or adult that were recovered from overlying fill deposits. The cranium is intact, and the mandibular processes articulates closely with TMJ. The cheek teeth of the two arcades match well in terms of size, development and occlusion. Most of the infra-cranial bones are nearly complete or intact, and surface preservation is good to excellent. Even though many of the ribs, vertebrae and hand and foot bones probably belong to Link 867, they are not re-associated to this individual since the possibility that they belong to another individual cannot be eliminated. Even so, other than slight osteoarthritic lipping in a few vertebrae, none of these elements evidences a paleopathological condition.

Age and Sex

Link 867 is a young adult female roughly 20 to 30 years old. The estimate of age is based on the congruence off developmental attributes of the pubic symphysis (Brooks and Suchey, 1990), auricular surface (Meindl and Lovejoy, 1989), sternal clavicle (Sheuer and Black, 2004) and rib ends. She is confidently diagnosed as female based on the concordance of results obtained by visual inspection of the subpubic region (Buikstra and Ubelaker, 1994) and osteometric sexing of the os coxae (Murail et al., 2005). The femoral maximum head diameter of 37.0 mm is well below the 42.6 mm sectioning point derived using Point of Pines skeletal data. Cranial features are ambiguous, but this is often the case for MVR Ancestral Pueblo populations.

Paleopathology Summary

Of the six observable indicators, a skeletal response to stress is limited to slight expressions of LEH and ectocranial porosis. A small pit on the occlusal surface of the maxillary right 2nd premolar does not intrude into the dentin. No bone from Link 867 has PR, nor does any of the non-associated elements in Structure 18 that might belong to this individual. The maximum femoral length of 39.1 cm is below the Point of Pines female mean of 40.1, but still within the 1st standard deviation. Skeletal trauma involves post-depositional damage incurred as dry-bone fractures or peri-mortem tooth punctures and gnawing inflicted by scavenging canids.

Abnormal porotic bone affects the cranial elements only (Fig. C.40). Slight and well-healed porotic responses are observable on the posterior parietals, each sphenoid and the anterior border of the left temporal. The diameter of the pits on the posterior parietals ranges from pin-point to 2 mm coalescing foramina. Each sphenoid has a scatter of pin-point to 1 mm pores. Slight, remodelled porotic bone extends across most of the alveolar margin of the maxilla, but the posterior maxilla is clear of such lesions. In contrast, the porosity within each orbit and the occipital is barely discernible and could be classed as absent. Diploic expansion cannot be evaluated in this intact cranium.

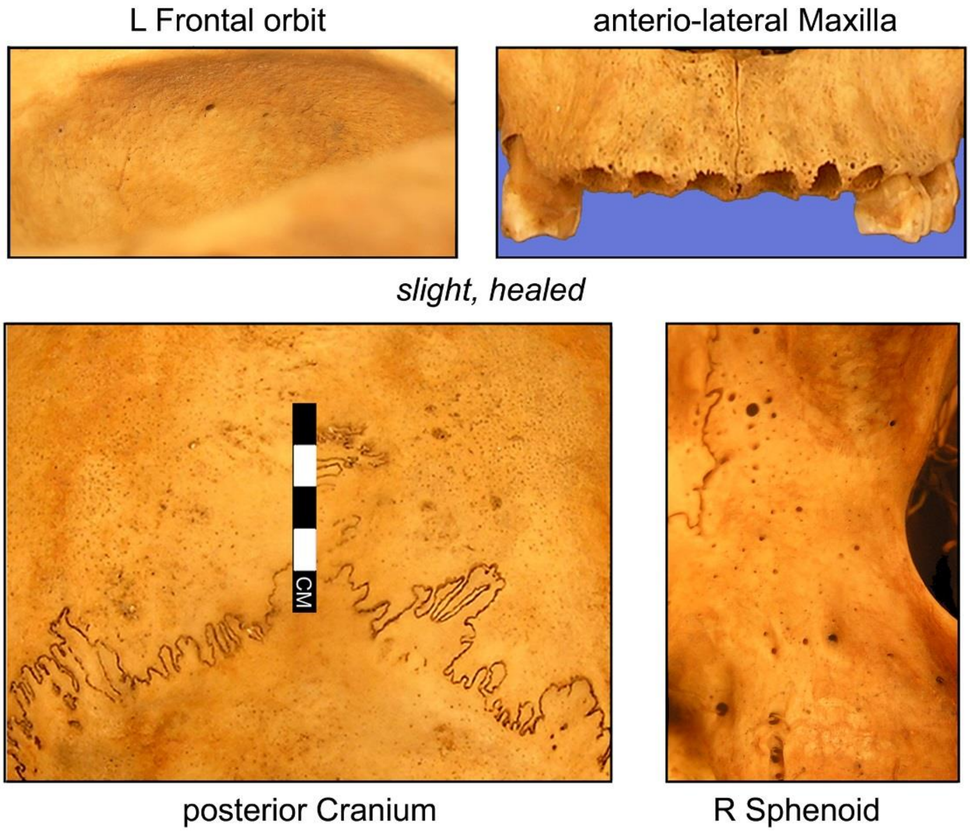


Fig. C.40: Slight and healed porotic responses of iLink 837 cranial elements; sphenoid porosity is diagnostic of scurvy.

Most of the anterior maxillary teeth are missing. Although porotic bone along the alveolar margin is suggestive of mild periodontal disease, the absence of remodelling within crypts suggests that most or all of the tooth loss occurred during the post-mortem disturbance by canids. The loose right maxillary canine refits closely into its socket, but no other loose permanent teeth were recovered in Structure 18. The seven suitable anterior teeth consist of the right maxillary canine, both mandibular canines and all four mandibular incisors. A single episode of systemic stress at 3.0 to 3.5 years of age (Malville, 1997) affected just the three canines, whereas the mandibular central incisors are unaffected. Of the 16 cheek teeth, just the left maxillary 1st premolar has an enamel defect (single pit) that developed between 2.5-3.0 years of age. Potentially, this defect is associated with the systemic stress that affected the canines during the following six-month interval; or, it could represent a localised trauma.

To summarise, the skeletal evidence from Link 867 suggests that this individual experienced mild to moderate episodes of nutritional insufficiency from which she recovered many months if not years prior to death. The absence of stunting indicates that longitudinal growth was not significantly disrupted by inadequate nutrition or disease processes. The sphenoid pitting is diagnostic of at least one episode of scurvy, but the coalescing pores on the parietals are perhaps more consistent with megaloblastic anaemia. The near absence of orbital lesions suggests that any involvement of these tissues during nutritional stress or haemorrhage was either quite mild or that sufficient time had passed to allow their almost complete obliteration during remodelling. Regardless of aetiology, the well-healed appearance of the vault and orbital lesions indicate that the underlying stress response occurred well before death. However, the less advanced remodelling along the alveolar margin suggests development closer to the time of death. Considering the conclusive evidence of at least one scorbutic episode, it could be that the alveolar porosity is representative perhaps another bout of Vitamin C deficiency rather than gingivitis associated with a cariogenic diet. The absence of the anterior maxillary teeth precludes assessment of whether they had the dental calculus that often accompanies gingivitis, but the cheek teeth have no such deposits. Since scurvy can result in the loosening of ligaments and tooth loss, it may be that some of the loss of the anterior maxillary teeth is associated with a scorbutic response. However, the sphenoid lesions are very well-healed, and if tooth loss was concurrent with that episode of scurvy, then one would expect some evidence of bone resorption within the empty tooth crypts. In the absence of active or even remodelling bone, it appears that Link 867 succumbed to an acute condition before a skeletal response could occur.

Appendix D: Mortuary Trends Database--Mesa Verde Region

Site, Dom.	MCT	Per.	Indiv.	Prov.	Post.	Age	Sex	Source
5DL, SP	ExMid	P3				A	U	Prudden, 1918
5DL, SP	ExMid	P3				C	U	Prudden, 1918
5DL, SP	ExMid	P3				C	U	Prudden, 1918
5DL, SP	ExMid	P3				A	U	Prudden, 1918
5DL, SP	ExMid	P3				A	U	Prudden, 1918
5DL, SP	ExMid	P3				A	U	Prudden, 1918
5DL, SP	ExMid	P3				A	U	Prudden, 1918
5DL, SP	ExMid	P3				C	U	Prudden, 1918
5DL, SP	ExMid	P3				A	U	Prudden, 1918
5DL.27	ExMid	P2				C	U	Guthe, 1949
5DL.27	ExMid	P2				A	M	Guthe, 1949
5DL.27	ExMid	P2				A	F	Guthe, 1949
5DL.27	ExMid	P2				A	F	Guthe, 1949
Site 3	ExMid	P2				I	U	Martin, 1938
Site 3	S RM Subfloor	P2		NN		A	M?	Martin, 1938
Site 3	ExMid	P2				A	M	Martin, 1938
Site 3	ExMid	P2				A	M	Martin, 1938
1.B	S RM Fill	P3	IP1-2	Room 3	E/S	MA	M	Karhu, 2000
1.B	S RM Subfloor	P3	IP1-1	Room 9	U	I	U	Karhu, 2000
1.C1	SubStFill	P2	IP1-13	EU119	F/L	MA	F	Karhu, 2000
1.C1	SubStFloor	P2	IP1-6		F/L	C	U	Karhu, 2000
1.C1	SubStFloor	P2	IP1-8		F/L	I	U	Karhu, 2000
1.C1	SubStFloor	P2	IP1-11		F/S-lf	C	U	Karhu, 2000
1.C1	Storage F.	P2	IP1-12		F/S-lf	YA	AM	Karhu, 2000
1.C2	Other Arch	P3	IP1-5	Kiva C	E/S	I	U	Karhu, 2000
1.C2	ExGrave	P3	IP1-9		U	I	U	Karhu, 2000
1.C2)	Other Arch	P3	IP2-1	Kiva D	F/S	C	U	Karhu, 2000
1.E	Other Arch	P3	IP1-10	Kiva E	F/P	I	U	Karhu, 2000
1.E	SubStFill	P3	IP1-14	Kiva E	unknown	C	U	Karhu, 2000
1.E (D)	SubStFill	P3	IP2-2	Kiva D	U	OA	U	Karhu, 2000
10010	ExMid	P2	F.6			C	U	Leonard et al., 2005
10010	ExMid	P2	F.40			OA	M	Leonard et al., 2005
10010	ExMid	P2	F.7.1			OA	F	Leonard et al., 2005
10207	Storage F.	P3			E/S	YA	M	Errickson, 1993
10991	S RM Floor	P3	no #		F/UN	OA	F	Wheeler-Smith, 2009
10991	ExGrave	P3	B1		F/UN	A	M	Wheeler-Smith, 2009
10991	ExGrave	P2	3645, B2			A	M	Wheeler Smith, 2009
10991	ExGrave	P2	B.2 (dup #)			C	U	Wheeler Smith, 2009
10991	ExGrave	P2	B3, PD 363			C	U	Wheeler Smith, 2009
10991	ExMid	P2	F. 6			YA	F	Wheeler-Smith, 2009
10991	ExMid	P2	1314, 1320			I	U	Wheeler-Smith, 2009
10991	ExMid	P2	B6, 2035			YA	PF	Wheeler-Smith, 2009
10991	ExMid	P2	4299			C	U	Wheeler-Smith, 2009
10991	ExMid	P3	3225			MA	M	Wheeler-Smith, 2009
10991	SubStFill	P2	B1, PD 452			OA	F	Wheeler Smith, 2009
Pueblo A	S RM Floor	P3		Rm 15	F/UN	C	U	Dove et al., 1997
Pueblo A	ExMid	P3	2574			A	U	Dove et al., 1997
Pueblo A	S RM Floor	P3		RM 13	F/UN	U	U	Dove et al., 1997

10991R1	ExMid	P3				A	U	Prudden, 1914
11555.G	Other Arch	P2	B1			I	U	Bradley, 2010
11555.H	S RM Fill	P2	B3	.		OA	F	B. Bradley, 2010
11555.H	SubStFloor	P2	B2			OA	M	Bradley, 2010
123	SubStFill	P2-P3	HRO 8	STR 1104		MA	U	Ryan, 2004
123	ExMid	P2-P3	HRO 4	NST 606		C	U	Ryan, 2004
123	ExMid	P2-P3	HRO 5	NST 901		C	U	Ryan, 2004
123	ExMid	EP3?	HRO 10	NST 9007		C	U	Ryan, 2004
123	ExMid	P2-P3	HRO 1	NST 801		I-YC	U	Ryan, 2004
123	ExMid	P2-P3	HRO 3	NST 901		YA	PF	Ryan, 2004
123	ExMid	P2-P3	HRO 2	NST 901		YA	U	Ryan, 2004
123	ExMid	P2	HRO6	NST 1103		A	F	Ryan, 2004
123	ExMid	P2	HRO11	NST 1041		MA	M	Ryan, 2004
123	ExMid	P2-P3	HRO 7	NST 9004		MA	U	Ryan, 2004
123	ExMid	P2-P3	HRO 9	NST 101		C	U	Ryan, 2004
123	ExMid	P2-P3	HRO 12	NST 101		MA	U	Ryan, 2004
13403	SubStFloor	P3			U	U	U	Luebben, 1982
13403	SubStFloor	P3			U	C	U	Luebben, 1982
1566	ExMid	P2				A	F	von Bonin, 1936
1566	ExMid	P2				A	M	von Bonin, 1936
1566	ExMid	P2				A	F	von Bonin, 1936
1566	ExMid	P2				A	M	von Bonin, 1936
1566	ExMid	P2				A	M	von Bonin, 1936
1566	ExMid	P2				A	M	von Bonin, 1936
1566	ExMid	P2				A	F	von Bonin, 1936
1566	ExMid	P2				A	M	von Bonin, 1936
2	ExMid	P3				U/S	U	Wilshusen/Lekson, 2003
2148	S RM Subfloor	P2	B1	R2.		I	U	Reed, 1979
2148	S RM Subfloor	P2	B2	R2.		MA	F	Reed, 1979
2148	S RM Subfloor	P2	B3	R2.		C	U	Reed, 1979
2336	ExGrave	P2	B29			YA	F	Dohm & Gould, 1986
2336	ExGrave	P2	B30			YA	F	Dohm & Gould, 1986
2433	SubStFloor	P2				A	F	Morris, 1986
2519	ExMid	P3				AO/y	U	Morris, 1991
2519	ExMid	P3				YA	F	Morris, 1991
2519	ExMid	P3				AO/y	U	Morris, 1991
2544	SubStSub	P3			F/L	I	U	Morris, 1991
2544	S RM Subfloor	P2		nn		I	U	Morris, 1991
2564	SubStFloor	P3	2.04		E/S	I	U	Hungerford et al., 2005
2715	Other Arch	P3			F/L	C	U	Luebben, 1985
3	ExMid	P3	3.1.15		F-E/P	C	U	O'Bryan, 1950
3	ExMid	P3	3.1.17			C	U	Karhu, 2000
3	ExMid	P3	3.1.27	EU113W		MA	U	Karhu, 2000
3	ExMid	P2-P3	3.2.14	TT2-1		YA	M	Karhu, 2000
3	ExMid	P2-P3	3.2.15	TT2-1		AO	F	Karhu, 2000
3	ExMid	P3	3.2.2	EU23		C	U	Karhu, 2000
3	ExMid	P3	3.3.2			AO/y	U	Karhu, 2000
3	ExMid	P3	3.3.22			I	U	Karhu, 2000
3	ExMid	P3	3.3.23			A	M	Karhu, 2000
3	ExMid	P2-P3	3.3.23	TT4		A	M	Karhu, 2000
3	ExMid	P3	3.3.24			A	F	Karhu, 2000
3	ExMid	P2-P3	3.3.24	TT4		YA	PF	Karhu, 2000
3	ExMid	P2				C	U	Karhu, 2000
3	ExMid	P2				C	U	Karhu, 2000

3	ExMid	P2				I	U	Karhu, 2000
3	ExMid	P2				MA	U	Karhu, 2000
3	ExMid	P2				I	U	Karhu, 2000
3	ExMid	P2				YA	F	Karhu, 2000
3	ExMid	P2				I	U	Karhu, 2000
3	ExMid	P2				I	U	Karhu, 2000
3	ExMid	P2				I	U	Karhu, 2000
3	ExMid	P2				I	U	Karhu, 2000
3	ExMid	P2				C	U	Karhu, 2000
3	ExMid	P2				I	U	Karhu, 2000
3	ExMid	P2				OA	M	Karhu, 2000
3.17	S RM Subfloor	P3	3.1.10	EU18	F/L	AO	AM	Karhu, 2000
3.17	ExGrave	P3	3.1.12		F/L	I	U	Karhu, 2000
3.17	S RM Fill	P3	3.1.2	EU1	F/L	YA	F	Karhu, 2000
3.17	Storage F.	P3	3.1.23	EU25	F/L	A	U	Karhu, 2000
3.17	Storage F.	P3	3.1.26	EU25	F/L	MA	AM	Karhu, 2000
3.17	S RM Subfloor	P3	3.1.3c	EU1	F/L	YA	F	Karhu, 2000
3.17	S RM Fill	P3	3.1.5	EU21	F/L	I	U	Karhu, 2000
3.17	S RM Subfloor	P3	3.1.9	EU18	F/L	YA	M	Karhu, 2000
3.17	ExGrave	P3	3.1.8		E/P	C	U	Karhu, 2000
3.17	Storage F.	P3	3.1.24	EU25	F/P	MA	U	Karhu, 2000
3.17	S RM Subfloor	P3	3.1.3a	EU1	F/E	YA	M	Karhu, 2000
3.17	S RM Subfloor	P3	3.1.3b	EU1	F/E	YA	F?	Karhu, 2000
3.17	ExGrave	P3	3.1.11		F/P	AO	F?	Karhu, 2000
3.17	S RM Fill	P3	3.1.13	EU18	U	I	U	Karhu, 2000
3.17	Storage F.	P3	3.1.25	EU25	U	C	U	Karhu, 2000
3.17	S RM Fill	P3	3.1.6	EU25	U	C	U	Karhu, 2000
3.17	S RM Fill	P3	3.1.7	EU25	U	YA	U	Karhu, 2000
3.24.H1	SubStFill	P2	3.1.19	EU24	F/L	I	U	Karhu, 2000
3.27	Other Arch	P3	3.2.17		F/S	A	M	Karhu, 2000
3.27	SubStSub	P3	3.2.3	EU29	F/L	MA	F?	Karhu, 2000
3.27	Storage F.	P3	3.2.5		F/L	YA	F	Karhu, 2000
3.27	SubStSub	P3	3.2.4		F/P	YA	F	Karhu, 2000
3.27	Other Arch	P3	3.2.8		F/S-l	YA	F	Karhu, 2000
3.38	ExGrave	P2	3.2.7		U	I	U	Karhu, 2000
3.46	ExGrave	P3	3.2.13		F/L	YA	M	Karhu, 2000
3.46	Storage F.	P3	3.3.10c		F/L	AO	F?	Karhu, 2000
3.46	SubStFill	P3	3.3.7a		F/L	AO/y	U	Karhu, 2000
3.46	SubStFill	P3	3.3.7b		F/L	YA	F	Karhu, 2000
3.46	Storage F.	P3	3.3.10b		E/P	A	M	Karhu, 2000
3.46	SubStSub	P3	3.3.9a		F/S-r	YA	F	Karhu, 2000
3.46	Storage F.	P3	3.3.10a		U	I	U	Karhu, 2000
3.46	Other Arch	P3	3.3.14		U	I	U	Karhu, 2000
3.46	SubStFill	P3	3.3.8		U	I	U	Karhu, 2000
3.46	SubStSub	P3	3.3.9b		U	I	U	Karhu, 2000
3.5	S RM Subfloor	P3	3.2.18	EU44	F/L	YA	M	Karhu, 2000
3.5	SubStFill	P3	3.2.6		F/L	C	U	Karhu, 2000
3.5	S RM Subfloor	P3	3.2.11	EU34	U	I	U	Karhu, 2000
3.5	S RM Subfloor	P3	3.2.9	EU37	U	I	U	Karhu, 2000
3.65	Storage F.	P3	3.1.20	EU73	AK/S	MA	M	Karhu, 2000
3.65	Storage F.	P3	3.1.14	EU1	F/L	AO	U	Karhu, 2000
3.65	S RM Subfloor	P3	3.1.18	EU79/80	F/L	C	U	Karhu, 2000
3.65	S RM Fill	P3	3.1.16	EU67	U	I	U	Karhu, 2000
3.65	S RM Subfloor	P3	3.2.1	EU7	U	I	U	Karhu, 2000

3.73	S RM Subfloor	P3	3.3.3	EU32	F/L	YA	M?	Karhu, 2000
3.73	S RM Subfloor	P3	3.3.5	EU32	FF/P	C	U	Karhu, 2000
3.73	S RM Subfloor	P3	3.3.11	EU48	E/S	I	U	Karhu, 2000
3.73	S RM Subfloor	P3	3.3.12	EU37	F/S	YA	AM	Karhu, 2000
3.73	Storage F.	P3	3.3.13a		F/S	YA	F	Karhu, 2000
3.73	S RM Fill	P3	3.3.4	EU37	F/S-lf	MA	F	Karhu, 2000
3.73	S RM Subfloor	P3	3.3.6	EU32	E/S	I	U	Karhu, 2000
3.73	Storage F.	P3	3.3.13b		U	C	U	Karhu, 2000
3.73	ExGrave	P3	3.3.15		U	I	U	Karhu, 2000
3.99	Other Arch	P3	3.1.21	EU104	F/L	MA	F	Karhu, 2000
3.Area 2	Storage F.	P2	3.2.16		F/L	C	U	Karhu, 2000
3.Area1	Other Arch	P2	3.1.22	EU105	F/L	I	U	Karhu, 2000
3.Area2	Other Arch	P2	3.2.12a		E/S	YA	F	Karhu, 2000
3.Area2	Other Arch	P2	3.2.12b		E/S	C	U	Karhu, 2000
3.Area3	Other Arch	P2	3.3.21		F/S	I	U	Karhu, 2000
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
4104	ExMid	P3				U	U	Martin, 1929
Ida Jean P.	S RM Fill	P2	B4	R7	F/L	C	U	Brisbin & Brisbin, n.d.
Ida Jean	S RM Fill	P2	B2	R7	F/L	C	U	Brisbin & Brisbin, n.d.
Ida Jean	S RM Floor	P2	B3	R7	F/L	C	U	Brisbin & Brisbin, n.d.
Ida Jean	S RM Floor	P3	NN	no info.		A	U	AHC records
Ida Jean	ExGrave	P2	B9			C	U	Brisbin & Brisbin, n.d.
Ida Jean	ExGrave	P2	B8			C	U	Brisbin & Brisbin, n.d.
Ida Jean	ExGrave	P2	B7			C	U	Brisbin & Brisbin, n.d.
Ida Jean	ExGrave	P2	B6			C	U	Brisbin & Brisbin, n.d.
Ida Jean	ExGrave	P2	B5			I	U	Brisbin & Brisbin, n.d.
Ida Jean	ExGrave	P2	?			U	U	Brisbin & Brisbin, n.d.
Ida Jean	S RM Floor	P3	NN	SE corner		U	U	Brisbin, pers.com. 2010
Wallace	S RM Fill	P3+	HR 1	9b	F/L	I	U	Bradley, 2017
Wallace	S RM Subfloor	P3	HR 11	27a	F/L	MA	M	Bradley, 2017
Wallace	S RM Subfloor	P3	HR 13	29	F/L	T	F	Bradley, 2017
Wallace	S RM Floor	P3	HR 2	17a	F/L	I	U	Bradley, 2017
Wallace	S RM Floor	P2	HR7	7a	F/L	I	U	Bradley, 1988

Wallace	S RM Floor	P2	HR8	19b	F/L	I F/N	U	Bradley, 1988
Wallace	S RM Floor	P3	17.185.46	17a	na	T	Unknown	
Wallace	S RM Floor	P3	17.190.65	17a	na	I	Unknown	
Wallace	S RM Floor	P3	18.5.790	18a	na	A	Unknown	
Wallace	S RM Floor	P3	18.5.794	18a	na	T	Unknown	
Wallace	S RM Floor	P3	26.28.101	26a	na	C	Unknown	
Wallace	S RM Floor	P3	5.24.266	5a	na	OA	Female	
Wallace	S RM Floor	P3	6.46.40	6a	na	I	Unknown	
Wallace	S RM Floor	P3	6.62.119	6a	na	I	Unknown	
Wallace	S RM Floor	P3	6.62.120	6a	na	I	Unknown	
Wallace	S RM Floor	P3	6.81.185	6a	na	I	Unknown	
Wallace	S RM Floor	P3	9.27.1794	9a	na	C	Unknown	
Wallace	S RM Floor	P3	iLink 326	5a	na	T	F	Bradley, 2017
Wallace	S RM Floor	P3	iLink 835	18a	na	C	U	Bradley, 2017
Wallace	S RM Floor	P3	iLink 836	18a	na	C	U	Bradley, 2017
Wallace	S RM Fill	P2	iLink 366	15b	na	I	U	Bradley, 2017
Wallace	S RM Floor	P3	iLink 867	18a	na	YA	F	Bradley, 2017
Wallace	ExMid	P2	ISE1909		na	I	U	Bradley, 2017
Wallace	ExMid	P2	ISE1910		na	I	U	Bradley, 2017
Wallace	ExMid	P2	ISE1911		na	I	U	Bradley, 2017
Wallace	S RM Floor	P3	Link 1038	26a	na	MA	Male	
Wallace	S RM Floor	P3	Link 261	5a	na	YA	Male	
Wallace	S RM Floor	P3	Link 502	17a	na	I	U	
Wallace	S RM Floor	P3	HR 10	26a	USF/S	T	F	Bradley, 2017
Wallace	ExMid	P2	HR 15		F/ S	A	U	Bradley, 2017
Wallace	S RM Floor	P3	HR 3	17a	USF/S	T	M	Bradley, 2017
Wallace	S RM Floor	P3	HR 4	17a	USF/S	MA	M	Bradley, 2017
Wallace	S RM Floor	P3	HR 5	17a	USF/S ?	T	F	Bradley, 2017
Wallace	S RM Floor	P3	HR 6	17a	USF/S	C	U	Bradley, 2017
Wallace	S RM Floor	P3	HR17	30a	USF/S	T	F	Bradley, 2017
Wallace	S RM Subfloor	P2	HR9	18a	F/S-r	C	U	Bradley, 1988
Wallace	S RM Subfloor	P3	HR 14	29	F/S-r	OA	F	Bradley, 2017
Wallace	S RM Floor	P2	HR12	18a	U	I F/N	U	Bradley, 1988
765	ExMid	P3	HR 1		U	I	U	Bradley, 1998
765	Other Arch	P3	HR9		F/L	I	U	Bradley, 1998
765	Other Arch	P3	HR8		F/L	I	U	Bradley, 1998
765	Other Arch	P3	HR16		F/L	C	U	Bradley, 1998
765	Other Arch	P3	HR17		F/L	AO/y	U	Bradley, 1998
765	Other Arch	P3	HR15		F/L	I	U	Bradley, 1998
765	Other Arch	P3	HR18		U	I	U	Bradley, 1998
765	S RM Fill	P3	B5		F/S	YA	F?	Kuckelman/Martin, 2007
7704	SubStFloor	P3			F/L	YA	F	Errickson, 1993
7723	SubStFloor	P2				C	U	Errickson, 1993
7723	SubStFloor	P2				U	U	Errickson, 1993
7723	Other Arch	P2				I	U	Errickson, 1993
7723	ExMid	P2				C	U	Errickson, 1993
8651	S RM Subfloor	P3	33.01		F/L	C	U	Leonard, 2005
8651	ExMid	P2				MA	F	Lambert, 1999
8651	S RM Subfloor	P2	aRoom			A	M	Lambert, 1999
8766	Other Arch	P2				C	U	Fetterman/Honeycutt, 1985
8827	Other Arch	P2				I	U	Kuckelman, 1988
8899	ExGrave	P2				A	M	Barnett, 1992
8899	ExGrave	P2				A	F	Barnett, 1992
8899	ExGrave	P2				A	F	Barnett, 1992

8899	ExGrave	P2			C	U	Barnett, 1992
8938	ExGrave	P2			A	F	Barnett, 1992
8938	ExGrave	P2			AO	F	Barnett, 1992
8938	ExGrave	P2			C	U	Barnett, 1992
8938	ExGrave	P2			I	U	Barnett, 1992
8943	ExMid	P2			YA	F	Errickson, 1993
8943	ExMid	P2			A	F	Errickson, 1993
8943	ExMid	P2			YA	M	Errickson, 1993
8943	ExMid	P2			YA	F	Errickson, 1993
8943	ExMid	P3			YA	F	Errickson, 1993
8943	Storage F.	P3			YA	F	Errickson, 1993
8943	ExMid	P2			C	U	Errickson, 1993
9541	SubStFill	P3	43	F/L	A	F	Kleidon, 2005
9847	ExMid	P2			A	M	Birnie, 1992
9847	ExMid	P2			C	U	Birnie, 1992
9869	ExMid	P2	3		MA	F	Hungerford et al., 2002
9924	ExMid	P2	7		YA	M	Stirniman, et al., 2005
9924	ExMid	P2	10		OA	M	Stirniman, et al., 2005
9924	ExMid	P2	42		MA	M	Stirniman, et al., 2005
9924	ExMid	P2	24		OA	F	Stirniman, et al., 2005
9924	ExMid	P2	14		MA	M	Stirniman, et al., 2005
9924	ExMid	P2	9		MA	F	Stirniman, et al., 2005
9924	ExMid	P2	22		MA	F	Stirniman, et al., 2005
9924	ExMid	P2	30		I	U	Stirniman, et al., 2005
9924	ExMid	P2	21		C	U	Stirniman, et al., 2005
9924	ExMid	P2	26		C	U	Stirniman, et al., 2005
9924	ExGrave	P2			MA	M	Stirniman, 2005
9933	ExMid	P3			YA	M	Kleidon, 2005
9934	ExMid	P2			C	U	McAndrews et al., 2005
9934.HA1,	SubStFill	P2	44.03		MA	M	McAndrews et al., 2005
9934.HA1,	SubStFill	P2	44.02		T	U	McAndrews et al., 2005
9934.HA2,	SubStFloor	P2	61.02		A	U	Billman/Robinson, 2005
9934.HA2,	SubStFloor	P2	60.01		OA	F	McAndrews et al., 2005
9942	ExMid	P2	22		AO	F	McAndrews et al., 2005
9942	SubStFloor	P2			A	F	McAndrews et al., 2005
9943	ExMid	P3			U	U	Stirniman et al., 2005
9943	ExMid	P3			U	U	Stirniman et al., 2005
9943	ExMid	P2	F.82		MA	M	Stirniman, et al., 2005
9943	ExMid	P3			U	U	Stirniman et al., 2005
9943	ExMid	P2	F.87		MA	M	Stirniman, et al., 2005
9943	ExMid	P3			U	U	Stirniman et al., 2005
9943	ExMid	P2	F.11		YA	F	Stirniman, et al., 2005
9943	ExMid	P2	F.93		C	U	Stirniman, et al., 2005
9943	ExMid	P2	F.4		YA	F	Stirniman, et al., 2005
9943.A1	SubStFloor	P3	7.72	E/S	OA	F	Stirniman et al., 2005
9943.A1	Storage F.	P3			C	U	Stirniman, 2005
9943.A1	Storage F.	P3			C	U	Stirniman, 2005
9943.A1	Storage F.	P3			AO	U	Stirniman, 2005
9943.HA2	SubStFill	P2			YA	F	Stirniman et al., 2005
UMT, 1	ExMid	P2			I	U	Reed, 1984
UMT, 1	ExMid	P2			I	U	Reed, 1984
UMT, 1	ExMid	P2			I	U	Reed, 1984
UMT, 1	ExMid	P2			I	U	Reed, 1984
UMT, 7	S RM Fill	P3	NN	F/P	I	U	Reed, 1944

UMT, 7	S RM Subfloor	P3	NN	E?	I	U	Reed, 1944
UMT, 7	ExMid	P2			I	U	Reed, 1984
UMT, 7	ExMid	P2			I	U	Reed, 1984
UMT, 7	ExMid	P2			I	U	Reed, 1984
UMT, 7	ExMid	P2			A	U	Reed, 1984
UMT, 7	ExMid	P2			A	U	Reed, 1984
2343/5	Storage F.	P3			I	U	Reed, 1944
2343/5	ExMid	P3			A	U	Nordby, 1974
2343/5	ExMid	P3			AO	F	Nordby, 1974
2343/5	ExMid	P3			I	U	Nordby, 1974
2343/5	ExMid	P3			C	U	Nordby, 1974
2346	S RM Floor	P3	B1	F/L	A	U	Nordby, 1974
2346	ExMid	P3			U	U	Nordby, 1974
2346	ExMid	P3			U	U	Nordby, 1974
2346	ExMid	P3			A	M	Reed, 1984/1985
2346	ExMid	P2			I	U	Reed, 1984
2346	S RM Floor	P2	U	U	U	U	Reed, 1984
2346	ExMid	P2			C	U	Reed, 1984
2346	ExMid	P2			A	PM	Reed, 1984
2346	ExMid	P2			I	U	Reed, 1984
MV1	ExMid	P2			A	M	O'Bryan, 1950
MV1	ExMid	P2			A	M	O'Bryan, 1950
MV1088	S RM Fill	P2	B2		I	U	Lister & Smith, 1968
MV1088	S RM Fill	P2	B3		A	U	Lister & Smith, 1968
MV1088	ExMid	P2			C	U	Lister & Smith, 1968
MV1104	ExGrave	P2			U	U	Lister & Breternitz, 1968
MV1104	ExMid	P2			A	U	Lister & Breternitz, 1968
MV1104	ExMid	P2			A	U	Lister & Breternitz, 1968
MV1104	ExMid	P2			C	U	Lister & Breternitz, 1968
MV1104	ExMid	P2			C	U	Lister & Breternitz, 1968
MV1104	ExMid	P2			U	U	Lister & Breternitz, 1968
MV1200	ExMid	P3	11	F/P	YA	M	Cattanach, 1980
MV1200	ExMid	P3	12	F/L	A	PM	Cattanach, 1980
MV1200	ExMid	P3	15	F/L	A	PF?	Cattanach, 1980
MV1200	ExMid	P3	16	F/L	A	M	Cattanach, 1980
MV1200	ExMid	P3	17	F/L	C	U	Cattanach, 1980
MV1200	ExMid	P3	18	F/L	YA	F	Cattanach, 1980
MV1200	ExMid	P3	23	F/L	C	U	Cattanach, 1980
MV1200	ExMid	P3	24	F/L	OA	M	Cattanach, 1980
MV1200	ExMid	P3	3	F/L	YA	F	Cattanach, 1980
MV1200	ExMid	P3	4	F/L	YA	M	Cattanach, 1980
MV1200	ExMid	P3	5	F/L	MA	M	Cattanach, 1980
MV1200	ExMid	P3	6	F/L	AO	U	Cattanach, 1980
MV1200	ExMid	P3	7	F/L	A	F	Cattanach, 1980
MV1200	ExMid	P3	8	F/L	MA	M	Cattanach, 1980
MV1200	ExMid	P3	10	F/S	YA	U	Cattanach, 1980
MV1200	ExMid	P3	1	F/S	AO	F	Cattanach, 1980
MV1200	ExMid	P3	20	u/S	AO	U	Cattanach, 1980
MV1200	ExMid	P3	21	F?/S?	I	U	Cattanach, 1980
MV1200	ExMid	P3	2	F/S-lf	C	U	Cattanach, 1980
MV1200	ExMid	P3	9	F/S-lf	C	U	Cattanach, 1980
MV1200	ExMid	P3	13	U	I	U	Cattanach, 1980
MV1200	ExMid	P3	14 (Dist)	F?	A	U	Cattanach, 1980
MV1200	ExMid	P3	19	U	I	U	Cattanach, 1980

MV1200	ExMid	P3	22	F?	I	U	Cattanach, 1980
MV1200.B	Other Arch	P3	34	U	A	U	Cattanach, 1980
MV1200.C	S RM Fill	P3	37	U/S	I	U	Cattanach, 1980
MV1200.D	SubStFill	P3	28	F/U	A	F	Cattanach, 1980
MV1200.F	S RM Fill	P3	25	F/L	I	U	Cattanach, 1980
MV1200.F	S RM Fill	P3	26	U	U	U	Cattanach, 1980
MV1200.H	S RM Fill	P3	30	FF/S	C	U	Cattanach, 1980
MV1200.J	S RM Subfloor	P3	29	u	C	U	Cattanach, 1980
MV1200.K	SubStFill	P3	39	U	I	U	Cattanach, 1980
MV1228	S RM Fill	P3	M1	F/L	OA	M	Rohn, 1971
MV1228	S RM Fill	P3	M3	F/L	YA	F	Rohn, 1971
MV1228	S RM Fill	P3	M4	F/L	I	U	Rohn, 1971
MV1228	ExGrave	P3	M44	F/L	C	U	Rohn, 1971
MV1228	ExGrave	P3	M45	F/L	C	U	Rohn, 1971
MV1228	ExGrave	P3	M46	F/L	YA	M	Rohn, 1971
MV1228	S RM Fill	P3	M42	F/P	I	U	Rohn, 1971
MV1228	ExGrave	P3	M43	E/P	A	M	Rohn, 1971
MV1228	S RM Fill	P3	M41	F/S	C	U	Rohn, 1971
MV1229	ExGrave	P3	M5	F/L	YA	F	Rohn, 1971
MV1229	ExGrave	P3	M10	F/L	C	U	Rohn, 1971
MV1229	ExGrave	P3	M14	F/L	I	U	Rohn, 1971
MV1229	ExGrave	P3	M30	F/P	MA	M	Rohn, 1971
MV1229	ExGrave	P3	M18	E/P	YA	M	Rohn, 1971
MV1229	ExGrave	P3	M6	F/S	YA	M	Rohn, 1971
MV1229	ExGrave	P3	M20	U/S	I	U	Rohn, 1971
MV1229	ExGrave	P3	M19	F/S	I	U	Rohn, 1971
MV1229	ExGrave	P3	M7	U	A	M	Rohn, 1971
MV1229	ExGrave	P3	M17	U	A	U	Rohn, 1971
MV1229	ExGrave	P3	M36	U	I	U	Rohn, 1971
MV1229	ExGrave	P3	M37	U	C	U	Rohn, 1971
MV1229	ExGrave	P3	M38	U	I	U	Rohn, 1971
MV1229	ExGrave	P3	M40	U	C	U	Rohn, 1971
MV1229	ExMid	P3			I	U	Rohn, 1971
MV1229	ExMid	P3			I	U	Rohn, 1971
MV1229	ExMid	P3			I	U	Rohn, 1971
MV1229	ExMid	P3			I	U	Rohn, 1971
MV1229	ExMid	P3			I	U	Rohn, 1971
MV1229	ExMid	P3			AO	U	Rohn, 1971
MV1229	ExMid	P3			I	U	Rohn, 1971
MV1229	ExMid	P3			YA	M	Rohn, 1971
MV1229	ExMid	P3			I	U	Rohn, 1971
MV1229	ExMid	P3			MA	M	Rohn, 1971
MV1229	ExMid	P3			C	U	Rohn, 1971
MV1229	ExMid	P3			C	U	Rohn, 1971
MV1229	ExMid	P3			C	U	Rohn, 1971
MV1229	ExGrave	P2	M33		C	U	Rohn, 1971
MV1229	ExMid	P2			C	U	Rohn, 1971
MV1229	ExGrave	P2	M21		YA	F	Rohn, 1971
MV1229	ExMid	P3			I	U	Rohn, 1971
MV1229	ExGrave	P3	M15		MA	F	Rohn, 1971
MV1229	ExMid	P3			YA	M	Rohn, 1971
MV1229	ExMid	P3			MA	M	Rohn, 1971
MV1229	ExMid	P3			MA	M	Rohn, 1971
MV1285	ExGrave	P3		F/L	U	U	Nordenskiold, 1979

MV1285	ExGrave	P3		F/L	A	M	Nordenskiold, 1979
MV1285	ExMid	P3		F/L	C	U	Nordenskiold, 1979
MV1285	ExGrave	P3		F/L	A	U	Nordenskiold, 1979
MV1285	ExGrave	P3		F/L	C	U	Nordenskiold, 1979
MV1285	ExGrave	P3		F/L	U	U	Nordenskiold, 1979
MV1285	ExGrave	P3		F/L	A	F?	Nordenskiold, 1979
MV1285	ExGrave	P3		F/L	A	U	Nordenskiold, 1979
MV1285	ExGrave	P3		F/L	I	U	Nordenskiold, 1979
MV1285.A	S RM Subfloor	P3	B1	E/	I	U	Nichols, 1972
MV1285.A	S RM Fill	P3	B2	E/U	I	U	Nichols, 1972
MV1452	Other Arch	P3	33	F/L	C	U	Hayes & Lancaster, 1975
MV1452	ExMid	P3	15	F/L	YA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P3	12	F/L	YA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			I	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			YA	F	Hayes & Lancaster, 1975
MV1452	ExMid	P2			YA	F	Hayes & Lancaster, 1975
MV1452	ExMid	P2			OA	F	Hayes & Lancaster, 1975
MV1452	ExMid	P2			I	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			I	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			C	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			YA	F	Hayes & Lancaster, 1975
MV1452	ExMid	P2			AO	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			I	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			A	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			A	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			A	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			A	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			A	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			C	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			MA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			MA	F	Hayes & Lancaster, 1975
MV1452	ExMid	P2			MA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			MA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			YA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			MA	F	Hayes & Lancaster, 1975
MV1452	ExMid	P2			YA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			MA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			I	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			MA	F	Hayes & Lancaster, 1975
MV1452	ExMid	P2			I	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			I	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			I	U	Hayes & Lancaster, 1975
MV1452	ExMid	P2			YA	M	Hayes & Lancaster, 1975
MV1452	ExMid	P2			MA	M	Hayes & Lancaster, 1975
MV1595	ExMid	P2	B1		AO	U	Swannack, 1969
MV1595	ExMid	P2	B10		AO	F	Swannack, 1969
MV1595	ExMid	P2	B14		AO	U	Swannack, 1969
MV1595	ExMid	P2	B3		AO	F	Swannack, 1969
MV1595	ExMid	P2	B15		AO	F	Swannack, 1969
MV1595	ExMid	P2	B2		AO	F	Swannack, 1969
MV1595	ExMid	P2	B19		AO	F	Swannack, 1969
MV1595	ExMid	P2	B4		A	F	Swannack, 1969
MV1595	ExMid	P2	B20		A	F?	Swannack, 1969
MV1595	ExMid	P2	B23		AO	M	Swannack, 1969

MV1595	ExMid	P2	B21			A	U	Swannack, 1969
MV1595	ExMid	P2	B11			MA	M	Swannack, 1969
MV1595	ExMid	P2	B18			I	U	Swannack, 1969
MV1595	ExMid	P2	B16			I	U	Swannack, 1969
MV1595	ExMid	P2	B13			I	U	Swannack, 1969
MV1595	ExMid	P2	B22			A	F?	Swannack, 1969
MV1595	ExMid	P2	B12			I	U	Swannack, 1969
MV1595	ExMid	P2	B5			YA	M	Swannack, 1969
MV1595	ExMid	P2	B9			MA	M	Swannack, 1969
MV1595	ExMid	P2	B17			YA	M	Swannack, 1969
MV1595	ExMid	P2	B8			YA	M	Swannack, 1969
MV1595.A	SubStFill	P2	B22			A	F?	Swannack, 1969
MV1595.B	Storage F.	P2	B24			MA	F?	Swannack, 1969
MV16	ExMid	P2				C	U	Lancaster/Pinkley, 1950
MV16	ExMid	P2				I	U	Lancaster/Pinkley, 1950
MV16	ExMid	P2				A	U	Lancaster/Pinkley, 1950
MV34	ExMid	P2-P3	B16			AO	F	O'Bryan, 1950
MV34	ExMid	P2-P3	B10			OA	PF	O'Bryan, 1950
MV34	ExMid	P3	B12			AO	U	O'Bryan, 1950
MV34	ExMid	P3	B7			AO	F	O'Bryan, 1950
MV34	ExMid	P3	B3			OA	F	O'Bryan, 1950
MV34	ExMid	P3	B15			A	M	O'Bryan, 1950
MV34	ExMid	P3	B4			A	F	O'Bryan, 1950
MV34	ExMid	P2-P3	B5			A	F	O'Bryan, 1950
MV34	ExMid	P2-P3	B6			A	F	O'Bryan, 1950
MV34	ExMid	P2-P3	B2			I	U	O'Bryan, 1950
MV34	ExMid	P2-P3	B9			I	U	O'Bryan, 1950
MV34	ExMid	P2-P3	B11			A	PM	O'Bryan, 1950
MV34	ExMid	P2-P3	B13			A	PF	O'Bryan, 1950
MV34	ExMid	P2-P3	B14			I	U	O'Bryan, 1950
MV34	ExMid	P2-P3	B1			I	U	O'Bryan, 1950
MV34	ExMid	P2-P3	B8			C	U	O'Bryan, 1950
MV34	ExMid	P2	B2			I	U	O'Bryan, 1950
MV34	ExMid	P2	B6			A	F	O'Bryan, 1950
MV34.1	S RM Subfloor	P3	B22	R.13	F/L	C	U	O'Bryan, 1950
MV34.1	S RM Subfloor	P3	B21	R.13	F/L	A	M	O'Bryan, 1950
MV34.1	S RM Subfloor	P3	B18	R.9	F/S	A	M	O'Bryan, 1950
MV34.2	S RM Subfloor	P2	B17	R.6		OA	F	O'Bryan, 1950
MV34.5	S RM Floor	P3	B24	R.36		OA	M	O'Bryan, 1950
MV34.5	S RM Fill	P3	B23	R.32		A	M	O'Bryan, 1950
MV34.5	S RM Subfloor	P3	B26	R.43		I	U	O'Bryan, 1950
MV34.5	S RM Floor	P3	B25	R.36		YA	M	O'Bryan, 1950
MV499	ExMid	P2				C	U	Lister, 1964
MV499	ExMid	P2				C	U	Lister, 1964
MV499	ExMid	P2				C	U	Lister, 1964
MV499	ExMid	P2				I	U	Lister, 1964
MV499	ExMid	P2				I	U	Lister, 1964
MV499	ExMid	P2				I	U	Lister, 1964
MV499	ExMid	P2				MA	U	Lister, 1964
MV499	ExMid	P3				A	M	Lister, 1964
MV499	ExMid	P3				A	F	Lister, 1964

MV522.A	Storage F.	P3	A	U	Fewkes, 1920
MV640	S RM Floor	P3	I	U	Nordenskiold, 1979;
MV640	S RM Floor	P3	I	U	Nordenskiold, 1979;
MV640	S RM Floor	P3	I	U	Nordenskiold, 1979;
MV640	S RM Floor	P3	A	U	Nordenskiold, 1979;
Far View	SubStFill	P2?	A	U	Fewkes, 1916
MV866	ExMid	P2	A	M	Lister, 1966
MV866	ExMid	P2	I	U	Lister, 1966
MV866	ExMid	P2	I	U	Lister, 1966
MV866	ExMid	P2	I	U	Lister, 1966
MV866	ExMid	P2	MA	M	Lister, 1966
MV866	ExMid	P2	MA	M	Lister, 1966
MV866	ExMid	P2	OA	M	Lister, 1966
MV866	ExMid	P2	OA	F	Lister, 1966
MV866	ExMid	P2	YA	U	Lister, 1966
MV866	ExMid	P2	YA	F	Lister, 1966
MV866	ExMid	P2	YA	F	Lister, 1966
MV866	ExMid	P2	YA	U	Lister, 1966
MV875	ExMid	P2	YA	F	Lister, 1966

Appendix D: Mortuary Trends Database--Middle San Juan Region

Site, Domicile	MCT	Per.	Indiv.	Prov.	Post.	Age	Sex	Source
Annex, AzW	ExMid	MV	131			I	U	Morris, 1934
Annex, AzW	S RM Subfloor	MV?	109	A11		A	F	Morris, 1934
Annex, AzW	S RM Subfloor	MV	113	A8		C	U	Morris, 1934
Annex, AzW	SubStFill?	MV	132			C	U	Morris, 1934
Annex, AzW	SubStFill	MV	139	Kiva A7		A	U	Morris, 1934
Annex, AzW	SubStFill	MV	140	Kiva A7		I	U	Morris, 1934
Annex, AzW	SubStFill	MV	141	Kiva A7		YA	U	Morris, 1934
Annex, AzW	SubStFill	MV	142	Kiva A7		C	U	Morris, 1934
Annex, AzW	SubStFill	MV	143	Kiva A7		C	U	Morris, 1934
Annex, AzW	SubStFloor	MV	112			I	U	Morris, 1934
Annex, AzW	SubStSub	MV	130			C	U	Morris, 1934
Annex, AzW	SubStSub	MV	133	Kiva A4		A	U	Morris, 1934
Annex, AzW	SubStFill	MV	135	Kiva A5		A	M	Morris, 1934
Annex, AzW	SubStFill	MV	136	Kiva A5		I	U	Morris, 1934
Annex, AzW	SubStFill	MV	137	Kiva A5		A	U	Morris, 1934
Annex, AzW	SubStFill	MV	138	Kiva A5		T	U	Morris, 1934
Annex, AzW	SubStFill	MV	47.1	Pitrm A12		A	M	Morris, 1934
Annex, AzW	SubStFill	MV	47.2	Pitrm A12		OA	F	Morris, 1934
Annex, AzW	SubStFill?	MV	116	Kiva A1		C	U	Morris, 1934
Annex, AzW	SubStFill?	MV	117	Kiva A1		I	U	Morris, 1934
Annex, AzW	SubStFill?	MV	118	Kiva A1		A	U	Morris, 1934
Annex, AzW	ExGrave	MV	129			A	U	Morris, 1934
Annex, AzW	ExGrave	MV	134	by A.27		I	U	Morris, 1934
Aztec W	ExGrave	MV	23			T	U	Morris, 1934
Aztec W	ExMid	Chaco	103			A	U	Morris, 1934
Aztec W	ExMid	Chaco	104			A	U	Morris, 1934
Aztec W	ExMid	Chaco	105			A	U	Morris, 1934
Aztec W	ExMid	MV	115			C	U	Morris, 1934
Aztec W	ExMid	MV	56			OA	M	Morris, 1934
Aztec W	ExMid	MV	57			I	U	Morris, 1934
Aztec W	ExMid	Chaco	58			A	U	Morris, 1934
Aztec W	ExMid	MV	59			A	U	Morris, 1934
Aztec W	S RM Subfloor	MV	106	183/W		A	M	Morris, 1934
Aztec W	S RM Subfloor	MV	107	183/W		C	U	Morris, 1934
Aztec W	S RM Subfloor	MV	108	183/W		YA	M	Morris, 1934
Aztec W	S RM Subfloor	P2-P3	13	107/S		I	U	Morris, 1934
Aztec W	S RM Subfloor	MV	26	1352/N		I	U	Morris, 1934
Aztec W	S RM Subfloor	MV	30	141/N		C	U	Morris, 1934
Aztec W	S RM Subfloor	MV	34	145/W		A (Y)	U	Morris, 1934
Aztec W	S RM Subfloor	MV	42	150/W		C	U	Morris, 1934
Aztec W	S RM Subfloor	MV	45	150/W		I	U	Morris, 1934
Aztec W	S RM Subfloor	MV	46	178/N		OA	F	Morris, 1934
Aztec W	S RM Subfloor	Chaco	81	43/E		T	F?	Morris, 1934
Aztec W	S RM Subfloor	MV	83	183/W		A	M	Morris, 1934
Aztec W	S RM Fill	MV	20	95/N	E/S	I	U	Morris, 1934
Aztec W	S RM Fill	MV	35	143/N	E/S	C/y	U	Morris, 1934
Aztec W	S RM Fill	MV	70	151/W	E/S	I	U	Morris, 1934
Aztec W	S RM Fill	MV	27	139N	F/S	A	M	Morris, 1934
Aztec W	S RM Fill	MV	51	1532/N	F/S	A	F	Morris, 1934
Aztec W	S RM Fill	MV	55	1532/N	F/S	YA	F	Morris, 1934
Aztec W	S RM Fill	MV	66	151/W	F/S	C	U	Morris, 1934
Aztec W	S RM Fill	MV	74	151/W	F/S	C	U	Morris, 1934
Aztec W	S RM Fill	MV	124	185/W	FF/S	YA	U	Morris, 1934
Aztec W	S RM Fill	MV	102	181/N		C	U	Morris, 1934

Aztec W	S RM Fill	MV	111	184/W	C	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	12	45/E	A	M	Morris, 1934
Aztec W	S RM Fill	MV	128	185/W	C	U	Morris, 1934
Aztec W	S RM Fill	MV	14.1	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.1	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.11	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.12	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.13	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.14	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.15	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.2	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.3	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.4	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.5	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.6	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.7	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.8	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	14.9	52/E	I	U	Morris, 1934
Aztec W	S RM Fill	MV	15	56/E	C	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	18	109/S	I	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	21	106/S	C	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	22.1	107/S	I	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	22.2	107/S	I	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	24.1	109/S	A	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	24.2	109/S	A	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	24.3	109/S	A	U	Morris, 1934
Aztec W	S RM Fill	MV	28	139/N	I	U	Morris, 1934
Aztec W	S RM Fill	MV	31	138/W	C	U	Morris, 1934
Aztec W	S RM Fill	MV	48	1532/N	I	U	Morris, 1934
Aztec W	S RM Fill	Chaco	5	2	I	U	Morris, 1934
Aztec W	S RM Fill	MV	52	1532/N	C	U	Morris, 1934
Aztec W	S RM Fill	MV	62	151/W	A	U	Morris, 1934
Aztec W	S RM Fill	MV	62	151/W	A	U	Morris, 1934
Aztec W	S RM Fill	MV	73	151/W	A	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	84	175/W	T	U	Morris, 1934
Aztec W	S RM Fill	P2-P3	85	175/W	T	U	Morris, 1934
Aztec W	S RM Fill	MV	9	33/E	A	F?	Morris, 1934
Aztec W	S RM Fill	MV	95	180/N	I	U	Morris, 1934
Aztec W	S RM Fill	MV	98	180/N	I	U	Morris, 1934
Aztec W	S RM Fill	MV	99	180/N	C	U	Morris, 1934
Aztec W	S RM Floor	MV	10	37/E	C	U	Morris, 1934
Aztec W	S RM Floor	MV	11	37/E	C	U	Morris, 1934
Aztec W	S RM Floor	MV	16.1	41/E	A	U	Morris, 1934
Aztec W	S RM Floor	MV	16.2	41/E	A	U	Morris, 1934
Aztec W	S RM Floor	MV	16.3	41/E	C	U	Morris, 1934
Aztec W	S RM Floor	MV	16.4	41/E	C	U	Morris, 1934
Aztec W	S RM Floor	MV	16.5	41/E	C	U	Morris, 1934
Aztec W	S RM Floor	P2-P3	17	77/N	I	U	Morris, 1934
Aztec W	S RM Floor	P2-P3	19	94/N	I	U	Morris, 1934
Aztec W	S RM Floor	MV	25.1	111/N	A	U	Morris, 1934
Aztec W	S RM Floor	MV	25.2	111/N	A	U	Morris, 1934
Aztec W	S RM Floor	MV	32	138/W	T	F?	Morris, 1934
Aztec W	S RM Floor	MV	36	1362/N	I	U	Morris, 1934
Aztec W	S RM Floor	MV	43	150/W	YA	M	Morris, 1934
Aztec W	S RM Floor	MV	60	147/N	A	U	Morris, 1934
Aztec W	S RM Floor	MV	61	151/W	A	U	Morris, 1934
Aztec W	S RM Floor	MV	8	29/E	A	F?	Morris, 1934
Aztec W	Storage F.	MV	38	1362/N	C	U	Morris, 1934
Aztec W	Storage F.	MV	39		C	U	Morris, 1934

Aztec W	Storage F.	MV	40			C	U	Morris, 1934
Aztec W	Storage F.	MV	41			I	U	Morris, 1934
Aztec W	Storage F.	MV	79	159/W		OA	F	Morris, 1934
Aztec W	Storage F.	MV	80	159/W		YA	U	Morris, 1934
Aztec W	SubStFill	P2-P3	6	Kiva B		I	U	Morris, 1934
Aztec W	SubStFill	P2-P3	7	Kiva B		T	U	Morris, 1934
Aztec W	S RM Fill	MV	1	1/S	F/L	A	U	Morris, 1934
Aztec W	S RM Fill	MV	100	180/N	F/L	OA	F	Morris, 1934
Aztec W	S RM Fill	MV	101	180/N	F/L	OA	U	Morris, 1934
Aztec W	S RM Fill	MV	110	184/W	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	119	185/W	F/L	OA	F	Morris, 1934
Aztec W	S RM Fill	MV	120	185/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	121	185/W	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	122	185/W	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	123	185/W	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	125	185/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	127	185/W	F/L	OA	U	Morris, 1934
Aztec W	S RM Fill	MV	2	1/S	F/L	A	U	Morris, 1934
Aztec W	S RM Fill	MV	3	1/S	F/L	A	U	Morris, 1934
Aztec W	S RM Fill	MV	33	138/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	37	1362/N	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	4	1/S	F/L	A	U	Morris, 1934
Aztec W	S RM Fill	MV	49	1532/N	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	50	1532/N	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	53	1532/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	54	1532/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	54	1532/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	54	1532/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	63	151/W	F/L	A	U	Morris, 1934
Aztec W	S RM Fill	MV	64	151/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	65	151/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	67	151/W	F/L	T	U	Morris, 1934
Aztec W	S RM Fill	MV	68	151/W	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	69	151/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	71	151/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	72	151/W	F/L	A	M?	Morris, 1934
Aztec W	S RM Fill	MV	75	151/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	76	151/W	F/L	YA	U	Morris, 1934
Aztec W	S RM Fill	MV	77	151/W	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	78	151/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	86	175/W	F/L	YA	F	Morris, 1934
Aztec W	S RM Fill	MV	87	175/W	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	88	182/N	F/L	A	F	Morris, 1934
Aztec W	S RM Fill	MV	89	180/N	F/L	OA	F	Morris, 1934
Aztec W	S RM Fill	MV	90	180/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	91	180/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	92	180/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	93	180/N	F/L	I	U	Morris, 1934
Aztec W	S RM Fill	MV	94	180/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	96	180/N	F/L	C	U	Morris, 1934
Aztec W	S RM Fill	MV	97	180/N	F/L	OA	M	Morris, 1934
Aztec W	S RM Fill	MV	126	185/W	F/P	OA	F	Morris, 1934
Aztec W	S RM, Indet.	MV	29.1	141/N		T	U	Morris, 1934
Aztec W	S RM, Indet.	MV	29.10	141/N		S	U	Morris, 1934
Aztec W	S RM, Indet.	MV	29.2	141/N		S	U	Morris, 1934
Aztec W	S RM, Indet.	MV	29.3	141/N		S	U	Morris, 1934
Aztec W	S RM, Indet.	MV	29.4	141/N		S	U	Morris, 1934
Aztec W	S RM, Indet.	MV	29.5	141/N		S	U	Morris, 1934
Aztec W	S RM, Indet.	MV	29.6	141/N		S	U	Morris, 1934

Aztec W	S RM, Indet.	MV	29.7	141/N	S	U	Morris, 1934
Aztec W	S RM, Indet.	MV	29.8	141/N	S	U	Morris, 1934
Aztec W	S RM, Indet.	MV	29.9	141/N	S	U	Morris, 1934
Aztec W	S RM, Indet.	P2-P3	44	150/W	C	U	Morris, 1934
Aztec W	S RM, Indet.	P2-P3	44	150/W	C	U	Morris, 1934
Aztec W	S RM, Indet.	P2-P3	44	150/W	C		Morris, 1934
AzWest	S RM Subfloor	MV	114	A.8	C	U	Morris, 1934
LA37592	ExGrave	P2	B6		T	U	Martin et al., 2001
LA37592	S RM Subfloor	P3	B2	201	C	U	Martin et al., 2001
LA37592	S RM Subfloor	P2-P3	B5	201	A	F	Martin et al., 2001
LA37592	Storage F.	P2-P3	B0.1		C	U	Martin et al., 2001
LA37592	Storage F.	P3	B3	201	F/N	U	Martin et al., 2001
LA37592	Storage F.	P2	B7		OA	F	Martin et al., 2001
LA37592	SubStFill	P3	B1		I	U	Martin et al., 2001
LA37592	SubStFill	P2-P3	B4		I	U	Martin et al., 2001
LA37593	Storage F.	P2	B1		I	U	Martin et al., 2001
LA37593	Storage F.	P2	B2		MA	F	Martin et al., 2001
LA37593	Storage F.	P2	B3		MA	M	Martin et al., 2001
LA37593	SubStFill	P2	B4		C	U	Martin et al., 2001
LA37594	SubStFill	P2	B1		C	U	Martin et al., 2001
LA37598	Storage F.	P2	B1		MA	M	Martin et al., 2001
LA37599	ExGrave	P2	B4		MA	M	Martin et al., 2001
LA37599	ExMid	P3	B1		U	U	Martin et al., 2001
LA37599	SubStFill	P2	B3		I	U	Martin et al., 2001
LA37599	SubStFill	P2	B5		YA	M	Martin et al., 2001
LA37599	SubStFill	P2	B6		C	U	Martin et al., 2001
LA37599	SubStFill	P2	B7		YA	F	Martin et al., 2001
LA37599	SubStFill	P2	B8		I	U	Martin et al., 2001
LA37599	SubStFill	P2	B10		YA	M	Martin et al., 2001
LA37599	SubStSub	P2	B9		YA	M	Martin et al., 2001
LA37599	Unknown	P2	B0.1		OA	U	Martin et al., 2001
LA37601	Oth. Arch.	P2-P3	B1		YA	M	Martin et al., 2001
LA37601	Oth. Arch.	P3	B8		C	U	Martin et al., 2001
LA37601	Storage F.	P2	B3		A	F	Martin et al., 2001
LA37601	Storage F.	P2	B6		YA	M	Martin et al., 2001
LA37601	Storage F.	P3	B11		C	U	Martin et al., 2001
LA37601	SubStFill	P2	B2		T	F	Martin et al., 2001
LA37601	SubStFill	P3	B4		YA	F	Martin et al., 2001
LA37601	SubStFill	P3	B5		MA	M	Martin et al., 2001
LA37601	SubStFill	P2	B7		MA	M	Martin et al., 2001
LA37601	SubStFill	P2	B9		I	U	Martin et al., 2001
LA37601	Unknown	P3	B10		MA	F	Martin et al., 2001
LA37601	Unknown	P2-P3	B12		YA	M	Martin et al., 2001
LA37603	Storage F.	P3	B1		MA	M	Martin et al., 2001
LA37603	SubStFill	P3	B2.1		YA	F	Martin et al., 2001
LA37603	SubStFill	P3	B2.2		F	U	Martin et al., 2001
LA37605	ExGrave	P2	B4		C	U	Martin et al., 2001
LA37605	S RM Fill	P2	B1	NN	I	U	Martin et al., 2001
LA65029	S RM Subfloor	P2	B1	101	I	U	Martin et al., 2001
LA65030	ExGrave	P2	B2		YA	F	Martin et al., 2001
LA65030	ExGrave	P3	B4		I	U	Martin et al., 2001
LA65030	Oth. Arch.	P2	B17		I	U	Martin et al., 2001
LA65030	S RM Subfloor	P3	B1	101	I	U	Martin et al., 2001
LA65030	S RM Subfloor	P3	B5	101	YA	F	Martin et al., 2001
LA65030	S RM Fill	P3	B3	101	I	U	Martin et al., 2001
LA65030	Storage F.	P3	B10		A	F	Martin et al., 2001
LA65030	SubStFill	P2	B12		YA	M	Martin et al., 2001
LA65030	SubStFill	P2	B13		C	U	Martin et al., 2001
LA65030	SubStFill	P2	B14		I	U	Martin et al., 2001

LA65030	SubStFill	P2	B15		MA	M	Martin et al., 2001
LA65030	SubStFill	P2	B16		YA	F	Martin et al., 2001
LA65030	SubStFill	P3	B6		MA	F	Martin et al., 2001
LA65030	SubStFill	P3	B7		C	U	Martin et al., 2001
LA65030	SubStFill	P3	B8		YA	F	Martin et al., 2001
LA65030	SubStFill	P3	B9		YA	F	Martin et al., 2001
Morris 36	ExGrave	P3, MV	NN		C	U	Morris, 1939
Morris 36	ExGrave	P3, MV	NN		C	U	Morris, 1939
Morris 36	ExGrave	P3, MV	NN		A	U	Morris, 1939
Morris 36	S RM Subfloor	P3, MV	NN	R7	A	U	Morris, 1939
Morris 36	S RM Subfloor	P3, MV	NN	R14	A	U	Morris, 1939
Morris 36	S RM Subfloor	P3, MV	NN	R1	C	U	Morris, 1939
Morris 36	S RM Subfloor	P3, MV	NN	R6	A	U	Morris, 1939
Morris 36	S RM Subfloor	P3, MV	NN	R1	C	U	Morris, 1939
Morris 36	S RM Subfloor	P3, MV	NN	R13	A	U	Morris, 1939
Morris 36	Storage F.	P3, Early	NN	R11	A	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	ExMid	P2	NN		U	U	Morris, 1939
Morris 39	S RM Floor	P2	NN	Bld 1, roomblock	C	U	Morris, 1939
Morris 39	Storage F.	P2	NN	Pit j1	U	U	Morris, 1939
Morris 39	SubStFill	MV?	NN	Kiva 5	U	U	Morris, 1939
Morris 39	SubStFill	MV?	NN	Kiva 5	U	U	Morris, 1939
Morris 39	SubStFill	P2	NN	Kiva 2	C	U	Morris, 1939
Morris 39	SubStFill	P2	NN	Pit j5	T	U	Morris, 1939
Morris 39	SubStFill	P2	NN	Pit j5	C	U	Morris, 1939

Morris 41	ExGrave	MV	30/127			A	F	Morris, 1939
Morris 41	ExGrave	P2	30/83			A	F	Morris, 1939
Morris 41	ExGrave	P2-P3	30/83			C	U	Morris, 1939
Morris 41	ExGrave	P2-P3	30/84			A	U	Morris, 1939
Morris 41	ExGrave	P2-P3	30/84			A	U	Morris, 1939
Morris 41	ExGrave	MV	NNP			U	U	Morris, 1939
Morris 41	ExGrave	MV	NNP			U	U	Morris, 1939
Morris 41	ExGrave	P2-P3	NNP			A	U	Morris, 1939
Morris 41	ExMid	PI	30/54			U	U	Morris, 1939
Morris 41	ExMid	P2	30/55			U	U	Morris, 1939
Morris 41	ExMid	P2	30/56			U	U	Morris, 1939
Morris 41	ExMid	MV	30/72			C	U	Morris, 1939
Morris 41	ExMid	P2-P3	30/76			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			C	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			U	U	Morris, 1939
Morris 41	ExMid	BMIII	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2-P3	NNP			U	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			A	U	Morris, 1939
Morris 41	ExMid	P2	NNP			C	U	Morris, 1939
Morris 41	ExMid	P2	NNP			C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/4	B1.R2	F/S	A	M	Morris, 1939
Morris 41	S RM Subfloor	MV	30/5	B1.R2	FF/S	A	M	Morris, 1939
Morris 41	S RM Subfloor	MV	30/37	B4.R2	U/F-un	A	M	Morris, 1939
Morris 41	S RM Subfloor	MV	30/37	B4.R2	U/F-un	T	F	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B8.R6	U/F-un	A	U	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/101	B7.R23		C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/71c	B7.R5		T	u	Morris, 1939
Morris 41	S RM Subfloor	P3	30/73	B7.R7		C	U	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/88	B7.R18		A	U	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/90	B7.R18		A	U	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/92	B7.R19		I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B1.R12		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R5		I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B1.R9		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R1		I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R6		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R8		A	U	Morris, 1939

Morris 41	S RM Subfloor	MV	NNP	B4.R10		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R4		T	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP			A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B3.R6		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R3		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R9		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B5.R3		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B6.R1		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B6.R2		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B6.R6		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B3.R1		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B3.R6		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R1		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R4		C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B5.R1		C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B6.R3		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B1.R1		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B2.R1		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B5.R2		C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B3.R1		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B3.R9		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R3		C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R4		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R1		I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R4		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B1.R1		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B3.R5		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B3.R6		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R4		C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B4.R4		C	U	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	NNP	B5.R26		A	U	Morris, 1939
Morris 41	S RM Subfloor	Early MV	NNP	B8.R8		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B11.R?		I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B11.R?		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B14.R6		I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B14.R6		I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B5.R1		C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B15.R12		A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B1.R7		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B1.R7		U	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B1.R7		U	U	Morris, 1939
Morris 41	S RM Floor	MV	30/104	B7.R23	E/S	I	U	Morris, 1939
Morris 41	S RM Floor	Early MV	30/96	B7.R22	U/F-un	A	M	Morris, 1939
Morris 41	S RM Floor	MV	30/27	B4.R3		A	U	Morris, 1939
Morris 41	S RM Floor	MV	30/27	B4.R3		A	U	Morris, 1939
Morris 41	S RM Floor	MV	30/27	B4.R3		C	U	Morris, 1939
Morris 41	S RM Floor	Early MV	30/97	B7.R22		A	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B6.R3		A	U	Morris, 1939
Morris 41	S RM Floor	P2	NNP	d under B3.R11		C	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B6.R2		C	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		C	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		C	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		A	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		A	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		A	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		A	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		A	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		A	U	Morris, 1939
Morris 41	S RM Floor	MV	NNP	B13.R2		A	U	Morris, 1939

Morris 41	S RM Floor	MV	NNP	B13.R2		A	U	Morris, 1939
Morris 41	Storage F.	P2-P3	30/102	B7.R23		C	U	Morris, 1939
Morris 41	Storage F.	P2	30/108	B7.R29		I	U	Morris, 1939
Morris 41	Storage F.	P2	30/108	B7.R29		I	U	Morris, 1939
Morris 41	Storage F.	MV	30/110	B7.R30		A	F	Morris, 1939
Morris 41	Storage F.	MV	30/111a	B7.R30		A	M	Morris, 1939
Morris 41	Storage F.	MV	30/111b	B7.R30		A	F	Morris, 1939
Morris 41	Storage F.	MV	30/68	B5.R13		A	M	Morris, 1939
Morris 41	Storage F.	P2	30/69	B5.R13		A	U	Morris, 1939
Morris 41	Storage F.	MV	30/70a	B7.R4		A	F	Morris, 1939
Morris 41	Storage F.	MV	30/70b	B7.R4		I	U	Morris, 1939
Morris 41	Storage F.	MV	30/77a	B7.R11		A	M	Morris, 1939
Morris 41	Storage F.	MV	30/77b	B7.R11		A	F	Morris, 1939
Morris 41	Storage F.	MV	30/77c	B7.R11		A	F	Morris, 1939
Morris 41	Storage F.	MV	30/77d	B7.R11		T	U	Morris, 1939
Morris 41	Storage F.	MV	30/77e	B7.R11		C	U	Morris, 1939
Morris 41	Storage F.	P2-P3	30/94	B7.R20		I	U	Morris, 1939
Morris 41	Storage F.	MV	NNP	B4.?		C	U	Morris, 1939
Morris 41	Storage F.	MV	NNP	B4.?		A	U	Morris, 1939
Morris 41	Storage F.	MV	NNP	B8.R7		I	U	Morris, 1939
Morris 41	SubStFill	P2	NNP	Kiva 8		U	U	Morris, 1939
Morris 41	SubStFill	P2	NNP	Kiva 8		U	U	Morris, 1939
Morris 41	SubStFill	P2	NNP	Under B15		C	U	Morris, 1939
Morris 41	S RM Floor	MV	30/95	B7.R21	F/L	A	M	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/100	B7.R23	F/L	C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/103	B7.R23	F/L	C	U	Morris, 1939
Morris 41	S RM Subfloor	P2	30/105	B7.R26	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	P2	30/106	B7.R26	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/109	B7.R29	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/112a	B7.R31	F/L	A	M	Morris, 1939
Morris 41	S RM Subfloor	MV	30/112b	B7.R31	F/L	A	F	Morris, 1939
Morris 41	S RM Subfloor	MV	30/113	B7.R32	F/L	A	F	Morris, 1939
Morris 41	S RM Subfloor	MV	30/132	B9.R4	F/L	C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/3	B1.R2	F/L	T	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/74	B7.R8	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/75	B7.R8	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/78	B7.R12	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/79	B7.R13	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/80	B7.R13	F/L	I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/81	B7.R13	F/L	I	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/82	B7.R13	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/85	B7.R16	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/86	B7.R16	F/L	C	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/87	B7.R18	F/L	A	F	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/89a	B7.R18	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/89b	B7.R18	F/L	T	U	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/91	B7.R19	F/L	C	U	Morris, 1939
Morris 41	S RM Subfloor	P2-P3	30/93	B7.R19	F/L	C	U	Morris, 1939
Morris 41	S RM Subfloor	Early MV	30/98	B7.R22	F/L	A	M	Morris, 1939
Morris 41	S RM Subfloor	P2	30/99	B7.R22	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	NNP	B1.R2	F/L	A	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/71a	B7.R5	F/P	T	U	Morris, 1939
Morris 41	S RM Subfloor	MV	30/71b	B7.R5	F/P	T	U	Morris, 1939
Morris 41	S RM, Indet.	P2	30/107	B7.R26	F/S	A	F	Morris, 1939
Morris 41	S RM, Indet.	P2-P3	NNP	B5.R15		A	U	Morris, 1939
Morris 41	S RM, Indet.	P2-P3	NNP	B5.R15		A	U	Morris, 1939
Salmon	ExGrave	San Juan	4			U	U	Reed, 2006
Salmon	ExGrave	San Juan	5			I	U	Reed, 2006
Salmon	ExGrave	MV	6			C/y	U	Reed, 2006

Salmon	ExGrave	San Juan	98			T	F	Reed, 2006
Salmon	S RM Subfloor	Chaco	1	4W		MA+	F	Reed, 2006
Salmon	S RM Subfloor	Chaco	14	33W		OA	M	Reed, 2006
Salmon	S RM Subfloor	MV	2	4A		MA	M	Reed, 2006
Salmon	S RM Subfloor	San Juan	37	86W		I	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	38	86W		MA	M	Reed, 2006
Salmon	S RM Subfloor	San Juan	39	86W		T	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	41	86W		U	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	42	86W		U	U	Reed, 2006
Salmon	S RM Subfloor	MV	43	88W		I	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	44	88W		C	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	57	97A		MA+	F	Reed, 2006
Salmon	S RM Subfloor	San Juan	62	97W		OA	M	Reed, 2006
Salmon	S RM Subfloor	San Juan	63	97W		T	F	Reed, 2006
Salmon	S RM Subfloor	MV	7	31W		C	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	73	121W		I	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	83	127W		T	F	Reed, 2006
Salmon	S RM Subfloor	San Juan	84	127W		C	U	Reed, 2006
Salmon	S RM Subfloor	MV	85	127W		I	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	86	127W		I	U	Reed, 2006
Salmon	S RM Subfloor	San Juan	87	127W		T	M	Reed, 2006
Salmon	S RM Subfloor	San Juan	88	127W		MA	F	Reed, 2006
Salmon	S RM Subfloor	San Juan	89	127W		F/N	U	Reed, 2006
Salmon	S RM Subfloor	Chaco	92	129W		C	U	Reed, 2006
Salmon	S RM Subfloor	MV	97	2W		A	U	Reed, 2006
Salmon	S RM Fill	MV	10	33B	E/S	C/y	U	Reed, 2006
Salmon	S RM Fill	San Juan	68	102B	E/S	T	F	Reed, 2006
Salmon	S RM Fill	MV	13	33B	F/S	I-YC	U	Reed, 2006
Salmon	S RM Fill	MV	52	94C	F/S	C	U	Reed, 2006
Salmon	S RM Fill	MV	77	122A/W	F/S	MA	M	Reed, 2006
Salmon	S RM Fill	MV	11	33B		T	F	Reed, 2006
Salmon	S RM Fill	MV	12	33B		C	U	Reed, 2006
Salmon	S RM Fill	San Juan	15	36W		YA	F	Reed, 2006
Salmon	S RM Fill	San Juan	16	36W		YA	M?	Reed, 2006
Salmon	S RM Fill	MV	18	37B		C	U	Reed, 2006
Salmon	S RM Fill	MV	19	37B		I	U	Reed, 2006
Salmon	S RM Fill	San Juan	21	43W		T	F	Reed, 2006
Salmon	S RM Fill	San Juan	22	43W		C	U	Reed, 2006
Salmon	S RM Fill	San Juan	29	62W		YA	F	Reed, 2006
Salmon	S RM Fill	San Juan	30	62W		T	U	Reed, 2006
Salmon	S RM Fill	San Juan	31	62W		MA	M	Reed, 2006
Salmon	S RM Fill	San Juan	32	62W		C	U	Reed, 2006
Salmon	S RM Fill	San Juan	33	82W		I	U	Reed, 2006
Salmon	S RM Fill	San Juan	34	82W		C/AO	U	Reed, 2006
Salmon	S RM Fill	San Juan	46	90W		MA	AM	Reed, 2006
Salmon	S RM Fill	San Juan	51	93W		I	U	Reed, 2006
Salmon	S RM Fill	San Juan	56	1W		T/A	U	Reed, 2006
Salmon	S RM Fill	San Juan	60	97B		I/yC	U	Reed, 2006
Salmon	S RM Fill	Chaco	65	100W		MA+	F	Reed, 2006
Salmon	S RM Fill	San Juan	66	100W		YA	F	Reed, 2006
Salmon	S RM Fill	San Juan	67	102B		C	U	Reed, 2006
Salmon	S RM Fill	San Juan	69	102B		T	M	Reed, 2006
Salmon	S RM Fill	San Juan	70	118W		C	U	Reed, 2006
Salmon	S RM Fill	San Juan	74	121W		I	U	Reed, 2006
Salmon	S RM Fill	San Juan	75	121W		I	U	Reed, 2006
Salmon	S RM Fill	MV	78	123B		MA	M	Reed, 2006
Salmon	S RM Fill	San Juan	79	123B		I	U	Reed, 2006
Salmon	S RM Fill	San Juan	82	127B		MA	F	Reed, 2006
Salmon	S RM Fill	San Juan	91	129W		OA	AM	Reed, 2006

Salmon	S RM Floor	San Juan	23	43W		YA	F	Reed, 2006
Salmon	S RM Floor	San Juan	28	58W		C	U	Reed, 2006
Salmon	S RM Floor	San Juan	3	11W		U	U	Reed, 2006
Salmon	S RM Floor	Ch-San Juan	80	124W		C	U	Reed, 2006
Salmon	S RM Fill	San Juan	24	43W	F/L	YA-MA	F	Reed, 2006
Salmon	S RM Fill	San Juan	61	97B	F/L	MA	M	Reed, 2006
Salmon	S RM Fill	San Juan	90	128A	F/L	C	U	Reed, 2006
Salmon	S RM, Indet.	San Juan	25	51W		I	U	Reed, 2006
Salmon	S RM, Indet.	San Juan	47	90W		C	U	Reed, 2006

Appendix D: Mortuary Trends Database--Chaco Canyon Locality

Site	MCT	Period	Indiv.	Prov.	Post.	Age	Sex	Source
C Ketl	ExMid	P2	CKEDUIB01			A	U	CAR, 2016
C Ketl	S RM/Unk	P2	CKR132IB02	132		A	F	CAR, 2016
C. Ketl	ExMid	P2	CKR132IB01	132	F	A	M	CAR, 2016
K. Kletso	S RM Fill	T. P2-3	1	41	F/S	I	U	Mathien, 1987
K. Kletso	S RM Fill	T. P2-3	2	37	F/L	I	U	Mathien, 1987
K. Kletso	S RM Subfloor	T. P2-3	3	52		C	U	Mathien, 1987
K. Kletso	S RM Subfloor	T. P2-3	4	16		I	U	Akins, 1986.B1
K. Kletso	S RM Subfloor	T. P2-3	5	16	U/L	I	U	Akins, 1986.B1
K. Kletso	S RM Fill	T. P2-3	6	11		T	F	Mathien, 1987
P Bonito	S RM/Unk	P2	A5803	56		YA	F	Pepper, 1909
P Bonito	S RM/Unk	P2	A5803	56		YA-MA	M	Pepper, 1909
P Bonito	S RM/Unk	P2	A5803	56		MA-OA	F	Pepper, 1909
P Bonito	S RM/Unk	P2	A5803	56		T	M	Pepper, 1909
P Bonito	S RM/Unk	P2	A5803	56		MA	M	Pepper, 1909
P Bonito	S RM Subfloor	P2	A6821	79		F/N	U	Pepper, 1920
P Bonito	S RM/Unk	P2	F42520	56		T	M	Pepper, 1909
P Bonito	S RM/Unk	P2	F42521	56		YA	F	Pepper, 1909
P Bonito	S RM Subfloor	P2	F42522	56		MA	F	Pepper, 1909
P Bonito	S RM/Unk	P2	H/3658a	32/33		I	U	Marden, 2011
P Bonito	S RM/Unk	P2	H/3658b	32/33		I	U	Marden, 2011
P Bonito	S RM/Unk	P2	H5628	56		I	U	Marden, 2011
P Bonito	S RM/Unk	P2	NN	329		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	NN	329		T/A	F	Judd, 1954
P Bonito	S RM Subfloor	P2	P N3075	56		MA	M	Pepper, 1909
P Bonito	S RM Subfloor	P2	PBR090IB00	90	U/P	C	U	Pepper, 1920
P Bonito	S RM Fill	P2	PBR287BI01	287		C	U	Pepper, 1920
P Bonito	S RM Subfloor	P2	PBR290IB01	290	F/P	I	U	Judd, 1954
P Bonito	S RM Subfloor	P2	PBR306IB01	306	E/S	I	U	Judd, 1954
P Bonito	S RM Floor	P2	PBR309IB01	309		F/N	U	Judd, 1954
P Bonito	S RM Floor	P2	PBR320IB01	320	seated	A	F	Judd, 1954
P Bonito	S RM Floor	P2	PBR320IB02	320	E/P	OA	F	Judd, 1954
P Bonito	S RM Floor	P2	PBR320IB03	320	E/P	A	F	Judd, 1954

P Bonito	S RM Floor	P2	PBR326IB04	326	E/S	A	F	Judd, 1954
P Bonito	S RM Floor	P2	PBR326IB05	326	E/S	A	F	Judd, 1954
P Bonito	S RM Floor	P2	PBR326IB06	326	E/S	A	F	Judd, 1954
P Bonito	S RM Floor	P2	PBR326IB07	326	E/S	A	F	Judd, 1954
P Bonito	S RM Floor	P2	PBR326IB08	326	E/S	I	U	Judd, 1954
P Bonito	S RM Floor	P2	PBR326IB09	326	E/S	A	F	Judd, 1954
P Bonito	S RM Floor	P2	PBR326IB10	326		A	AM	Judd, 1954
P Bonito	S RM Floor	P2	PBR326IB11	326	F/L	YA-MA	F	Judd, 1954
P Bonito	S RM Floor	P2	PBR329IB01	329	F/L	C	U	Judd, 1954
P Bonito	S RM Floor	P2	PBR329IB02	329		I	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR329IB03	329		T	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR329IB04	329		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR329IB05	329		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR329IB06	329		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB01	330		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB02	330		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB03	330		T/A	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB04	330		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB05	330		T/A	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB06	330		A	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB07	330	E/S	T/A	Male	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB08	330	E/S	T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB09	330	E/S	U	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB10	330	E/S	T/A	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB11	330		A	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB12	330		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB13	330		T/A	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB14	330		T	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB15	330		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB16	330		T	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB17	330		T/A	M	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB18	330		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB19	330		T/A	F	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB20	330		C	U	Judd, 1954
P Bonito	Storage F.	P2	PBR330IB21	330		C	U	Judd, 1954
P Bonito	S RM/Unk	P2	PBR330IB22	330		T/A	Male	Judd, 1954
P Bonito	S RM Subfloor	P2	PBR330IB23	330	F/S	A	Male	Judd, 1954
P Bonito	S RM Subfloor	P2	PBR330IB24	330	F/L	A	Male	Judd, 1954
P Bonito	S RM Floor	P2	S1/A3659	33	E/S	MA	F	Pepper, 1909
P Bonito	S RM Floor	P2	S10/A3668	33		YA	M	Pepper, 1909
P Bonito	S RM Floor	P2	S11/A3669	33		MA	M	Pepper, 1909
P Bonito	S RM Floor	P2	S12/A3670	33		MA	M	Pepper, 1909
P Bonito	S RM Floor	P2	S13/A3671	33	E/L	MA	M	Pepper, 1909
P Bonito	S RM Floor	P2	S14/A3672	33	E/S	MA	M	Pepper, 1909
P Bonito	S RM Floor	P2	S2/A3660	33		MA-OA	F	Pepper, 1909
P Bonito	S RM Floor	P2	S3/A3661	33		YA	M	Pepper, 1909
P Bonito	S RM Floor	P2	S4/A3662	33		MA	M	Pepper, 1909
P Bonito	S RM Floor	P2	S5/A3663	33		MA	F	Pepper, 1909
P Bonito	S RM Floor	P2	S6/A3664	33		MA	M	Pepper, 1909
P Bonito	S RM Floor	P2	S7/A3665	33		YA	F	Pepper, 1909
P Bonito	S RM Floor	P2	S8/A3666	33		YA-MA	F	Pepper, 1909
P Bonito	S RM Floor	P2	S9/A3667	33		YA	F	Pepper, 1909

P d Arroyo	SubStFill	T. P2-3	PRKHIB02	Kiva H		C	U	Judd, 1959
P d Arroyo	SubStFill	T. P2-3	PRKIIB01	Kiva I		C	U	Judd, 1959
P d Arroyo	S RM Fill	T. P2-3	PRR004IB01	4		I	U	Judd, 1959
P d Arroyo	S RM Fill	T. P2-3	PRR009IB01	9		A	M	Judd, 1959
P d Arroyo	S RM Fill	T. P2-3	PRR010IB01	10A		A	M	Judd, 1959
P d Arroyo	S RM Fill	T. P2-3	PRR011IB01	11A		T	U	Judd, 1959
P d Arroyo	S RM Floor	T. P2-3	PRR013IB01	13A	F/UN	T	M	Judd, 1959
P d Arroyo	S RM Fill	T. P2-3	PRR021IB1	21		A	F	Judd, 1959
P d Arroyo	S RM Fill	T. P2-3	PRR024IB01	24		U	U	Judd, 1959
P d Arroyo	S RM Floor	T. P2-3	PRR040IB01	40	F/L	A	M	Judd, 1959
P d Arroyo	S RM Fill	T. P2-3	PRR063IB01	63		U	U	CAR, 2016
P d Arroyo	S RM Fill	T. P2-3	PRR082AIB0	82A		YA	M	CAR, 2016
P d Arroyo	ExGrave	T. P2-3	PRTWR024I			U	U	CAR, 2016

Appendix E

Wallace Ruin: Carnivore intrusions

The population estimate of 32 Pueblo III individuals reported in the Chapter 8 pertains to the West Arm. Subtraction of the *in situ* remains from this MLNI means that the cadavers of at least 22 individuals were disturbed by carnivores. However, this result does not provide any insights into many primary burial deposits may have been disturbed by carnivores, the effects of that intrusion on bone representation, or a measure of the scale of effort undertaken in the re-deposition of bones in the North Suite. Moreover, this intrusion prompts numerous questions regarding the relocations of bones to another part of the site. For example, are most of the bones still in their depositional chamber, and how many bones were re-located to the North Suite? Were specific bones selected, or excluded, for re-deposition? Also, since an individual's membership in one of the four basic age groups was not a crucial factor in selection decisions regarding deposition at Wallace, did this inclusive perspective persist with re-deposition choices? Were the small bones of infants and young children left behind, or does the evidence suggest attentiveness to the remains of all? Can the locus of intrusion be determined, and what is the basis of evidence that the North Suite contains re-deposited bones? How sound is B. Bradley's (1974; 1988) interpretation that the North Suite bones originated in South Suite rooms? Moreover, what were the logistics involved in transferring bones to the ground floors of the North Suite? Was it a straightforward matter of walking through a few doorways, or did it entail a significant degree of effort. Finally, what would that scale of effort indicate about attitudes towards these dead? Also of interest is when the carnivore intrusion occurred relative to the human intrusions into Rooms 17a and 27a. Did one or both provide a means of entry into the great house, or did they precede the intentional disturbances of HR 4 and HR 11? Accordingly, the detailed analyses that follow are oriented towards the resolution of these questions, rather than a full-scale evaluation of all carnivore damage.

DEMOGRAPHY

Raw data and results obtained for population estimates for human remains disturbed by the carnivore intrusion are provided in Tables E.1 and E.2, by Suite, using the Adams and Konigsberg (2004) Excel spreadsheet for multiple skeletal elements. Each set comprises the four most common paired elements per Suite. The South Suite assemblage includes the iLinks from Room 18a and it would also include intrusive Pueblo III elements from adjacent structures; however, but none of those bones are among the common element types. Structure 7 contains only one element used for estimation of the North Suite MNI. This carnivore-damaged scapula is included on the basis that Ancestral Puebloans probably intended to deposit it within that more secure location. The total MLNI of these two groups (26) is higher than the difference between the P3WR MLNI of 32 less the 10 *in situ* individuals (22) reported in the Chapter 6 because the latter calculation uses different homologues, as is also the case for both suites. As discussed at greater length below, although there are multiple unpaired long bones, none has a certain antimere in the alternate suite. Additional information needs to be considered before any conclusions are drawn regarding scale of effort, but just from this evidence more than 60 long bones were re-deposited in North Suite rooms.

These same homologues, per suite, are used to determine the number of individuals per age group. Both West Arm subunits are represented by at least two individuals per age group, whereas two floor MCT age groups are represented by a single individual. Other bones within each subunit indicate that age classes are represented by additional individuals. This is particularly the case in the North Suite, where infants and children are better represented than older individuals, in terms of these elements. Even so, these results provide a reasonable means to appraise skeletal representation within these three distinct contexts.

Table E.1: South Suite MNI and MLNI calculations by the four most common skeletal elements, in order of occurrence. These results exclude elements from primary burials HR 10 and HR 11.

	Tibia	**Humerus**	**Fibula**	**Femur**	**Overall**
Total	12	11	11	9	43
L	6	5	7	5	23
R	6	6	4	4	20
P	3	1	3	3	10
MNI	9	10	8	6	10
MLNI	12	17	10	8	**12**

Table E.2: North Suite (and STR 7) MNI and MLNI calculations by the four most common bone types, in order of occurrence.

	Clavicle	**Femur**	**Scapula**	**Tibia**	**Overall**
Total	19	16	14	13	62
Left	10	8	7	5	30
Right	9	8	7	8	32
Pairs	6	5	3	3	17
MNI	13	11	11	10	13
MLNI	14	12	14	12	**14**

Table E.3: Age group representation of P3WR ISE disturbed by carnivores vs. all *in situ* primary burials in a room floor MCT.

	South Suite	**North Suite**	**Floor PB**
Infant	2	5	4
Child	4	4	1
Adolescent	2	2	4
Adult	4	2	1
Total	12	13	10

Element Representation

Representativeness determinations are founded on the number of bones observed in an archaeological context versus the expected, anatomic, number relative to the Minimum Number of Individuals (Bello and Andrews, 2009:3). However, the calculations used here are based on the more accurate Most Likely Number of Individuals determinations noted above. Owing to skeletal development differences such tallies must also take age group differences into account; the criteria used here, which are provided in Table E.4 are drawn from

Scheuer and Black (2004) and Baker and colleagues (2004). In short, the numbers of skeletal elements per developmental age group are multiplied by the MLNI per group, and then summed for the total representation per context.

Table E.4: Expected representation of skeletal elements by age group and type.

	Infant	**Child**	**Adolescent**	**Adult**	**C/AO/A**
	Exp x 1	*Exp x 1*	*Exp x 1*	*Exp x 1*	*Exp x 1*
Skull (elements)	19 x 1	Cranium= 1	Cranium= 1	Cranium= 1	(15 x 1)
Cranium/CranVault	9	1	1	1	8
Cranio-facial	8				7
Mandible	2	1	1	1	1
Long bones	12	12	12	12	12
Flat bones	6	7	7	7	7
Irregular bones	85	78	82	82	82
Short bones	76	76	76	76	76
Total	198	175	179	179	193

Although comparison to element representation in living humans provides a fundamental benchmark, it does not necessarily allow for the interrogation of specific taphonomic processes. The question here is not about differential bone loss, but the effects of the carnivore incursion. Therefore, other sources of bone loss need to be eliminated, or at least minimised. Comparisons to Wallace's *in situ* floor MCT element representation regardless of temporal period provides a reasonable expectation for bone survival involving deposit in an open space within the great house. The inclusion of data from three Pueblo II infants, of an age in which bone preservation is tenuous, is particularly worthwhile since HR 2 of Room 17 is the only PIII infant primary burial.

As is evident in Figure E.1, the loss of elements is a recurrent taphonomic condition on great house floors, with just 64% of expected bones recovered. Even so, apart from foot bones, skeletal regions are well-represented, with 60% to 80% of elements present. In contrast, the North and South Suite subgroups are poorly represented in total and in respect to most skeletal types. As an example, the South Suite contains just 45 of an expected 510 foot bones. The very poor representation of South Suite elements (18%) may be the result of two distinct though related processes. The first involves the destruction of elements or removal of bones to exterior locations by carnivores, and the second seemingly involves the intentional relocation of bones to the North Suite by humans.

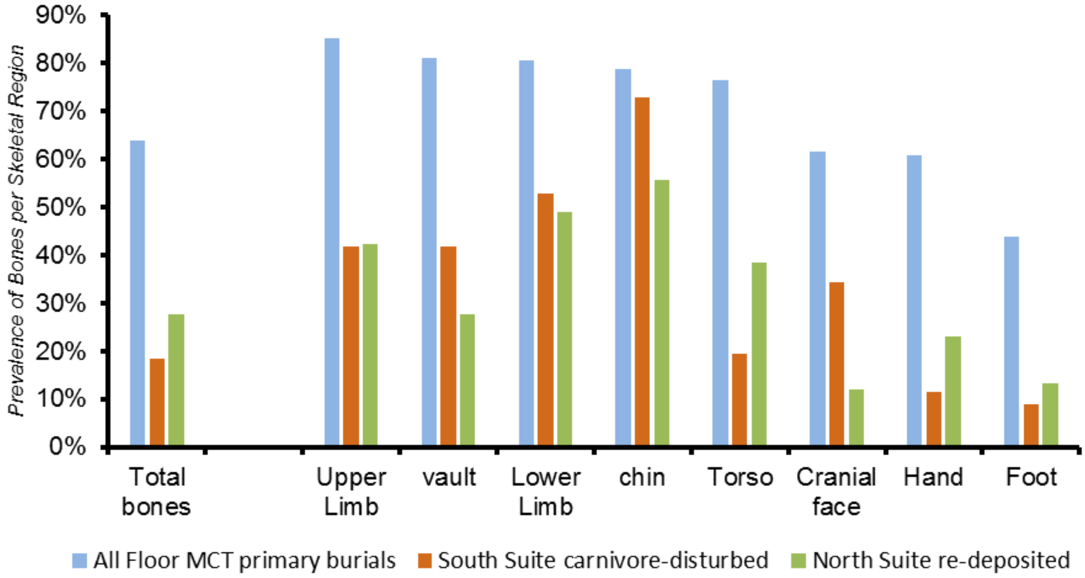


Figure E.1: Representation of P3WR skeletal elements by archaeological context and skeletal type.

Although hand and foot (extremity) bones in the two disturbed (i.e., Suite) contexts are rarely damaged, a consistent pattern involves the greatest loss of bones from the face, torso, and extremities. The better representation of cranial vault bones amongst South Suite ISE is especially influenced by the presence of three intact crania of the iLinks in Room 18a, in contrast to the single intact cranium in the North Suite (iLink 326). An interesting result is that though the 28% representation for North Suite remains is also poor, extremity representation equals or exceeds the South Suite occurrence. Potentially, this indicates that some emphasis was placed on retrieving even these small bones, including those of infants and children. Even so, the Figure E.2 colour-coded visual inventories of all West Arm ISE show that each Suite (including adjacent structures) contains all bone types, from both sides, with very few exceptions. Element types used in population estimations are highlighted in bold.

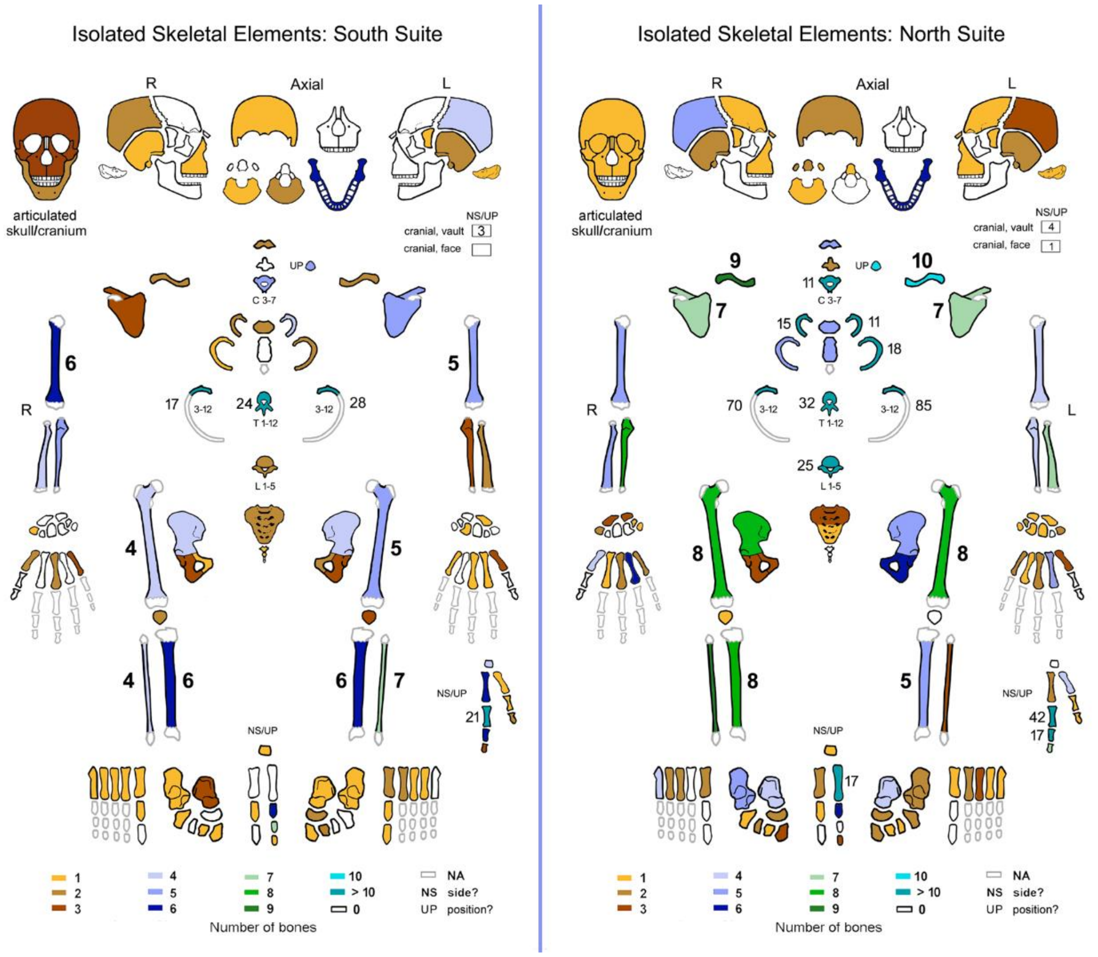


Figure E.2: Visual inventory of P3WR isolated skeletal elements by South and North Suite; MLNI determinations are 12 and 14, respectively.

TAPHONOMY

For descriptive and interpretive needs, it is necessary to document the extent of the carnivore damage, and possible associated weathering; both are deemed as evidencing a Pueblo III taphonomic signature since neither attribute is present in bones from indisputable Pueblo II contexts. Tooth impression size and shape indicate that the scavengers of P3WR remains were large-bodied animals such as canids, mountain lions or bears (Carson et al., 2000; Dominguez-Rodrigo and Piqueras, 2003). A detailed analysis of tooth marks and other such damage was not performed. However, canids are probable agents since they are most frequently reported as perpetrators in forensic studies involving outdoor environments (Haglund, 1997:367). Moreover, this genus is most prevalent in the Mesa Verde Region. Whether they may have been domestic or feral dogs (*Canis familiarus*), coyotes (*Canis latrans*) or wolves (*Canis lupis*) is unknown.

Table E.5 provides an inventory of the 1379 P3WR ISE and occurrence of carnivore-damage by element type, including 15 conjoined bones, excluding 65 loose teeth. Refits are rare mainly because long bones shafts were typically reduced to bone cylinders rather than broken apart through transverse or spiral fracture. In addition, gnawing removed large regions of bone, with distal ends of humerii, femora, tibiae and especially pelvic elements most severely affected.

Regardless of suite location, P3WR damage evidence follows the pattern observed in retrospective (discovered corpses) and actualistic (experimental) forensic studies (Haglund, 1997; Haglund et al., 1989; Pokines and Tersigni-Tarrant, 2013). That is, in a fresh human body corpse destruction by carnivores tends to follow this sequence: internal organs of the thoracic cavity; disarticulation of the large muscle masses of the limbs; destruction of small thoracic elements (clavicle, rib, vertebrae, sternum); dispersal of disarticulated anatomic units; damage to individual skeletal elements, including consumption of the smaller bones of the hands and feet; and, the reduction of long bones to bone cylinders as the epiphyseal regions at each end are destroyed during gnawing. Rodents and carnivores will attack the fragile bones of the face, but the calvarium is rarely targeted by canids owing to the difficulty of grasping an intact cranium between the jaws. In contrast, the unfused cranial bones of children are quite susceptible to damage, regardless of element type.

A total of 43 ISE are weathered, with most evidencing Stage 1 attributes (Behrensmeyer (1978). This damage is primarily attributable to structure collapse. Considering that 95% of the bones in North Suite/STR 7 proveniences have no weathering, another possibility is that some of the 21 bones so affected were temporarily exposed when carnivores removed them from the great house to get them away from competitors (Pokines and Tersigni-Tarrant, 2013:328).

Table E.5: Inventory of P3WR ISE by type and in respect to elements having sound evidence of damage by carnivores.

Bones	Total N	N after Conjoins	N Damaged	% Damaged
Skull	**121**	**114**	**6**	**0.05**
Cranium, articulated	4	4	0	0.00
Cranial vault, non-articulated	88	82	5	0.06
Cranial, face	10	9	0	0.00
Mandible	19	19	1	0.05
Long Bones	**188**	**182**	**52**	**0.28**
Humerus	25	24	11	0.46
Radius	22	22	3	0.14
Ulna	26	26	7	0.27
Femur	32	31	14	0.45
Tibia	35	32	11	0.32
Fibula	28	27	4	0.15
Epiphysis, upper limb	1	1	0	0.00
Epiphysis, lower limb	13	13	2	0.15
Indeterminate fragments	6	6	0	0.00
Flat Bones	**96**	**96**	**26**	**0.27**
Scapula	34	34	8	0.24
Os Coxae	10	10	9	0.90
Ilium	12	12	6	0.50
Pubis/Ischium	13	13	3	0.23
Sacrum (& segments)	14	14	0	0.00
Sternum (2)	13	13	0	0.00
Irregular Bones	**699**	**697**	**107**	**0.15**
Clavicle	25	25	3	0.12
C1	9	9	1	0.11
C2	4	4	0	0.00
C3-C7	22	22	0	0.00
T1-T12	74	74	13	0.18
L1-L5	34	34	11	0.32
Centrum	22	22	0	0.00
Hyoid	1	1	0	0.00
1st Rib	26	26	3	0.12
2nd Rib	23	23	3	0.13
Ribs 3-12	367	365	63	0.17
Coccyx	2	2	0	0.00
Patella	7	7	4	0.57
Carpals	29	29	0	0.00
Calcaneus	10	10	2	0.20
Talus	14	14	3	0.21
Other tarsals	29	29	1	0.03
Indeterminate	1	1	0	0.00
Short Bones	**275**	**275**	**12**	**0.04**
Metacarpal	79	79	7	0.06
Phalanx, hand	102	102	2	0.02
Epiphysis, hand	6	6	0	0.00
Metatarsal	56	56	3	0.05
Phalanx, foot	30	30	0	0.00
Epiphysis, foot	1	1	0	0.00
Epiphysis, unknown	1	1	0	0.00

Comparison of the number and prevalence of damaged human bones by West Arm structure supports the interpretation advanced in the previous chapter that South Suite Rooms 26a (43%) and 18a (40%) were the locus for carnivore disturbance of primary burials. Table E.6 below presents damage tallies by structure, by decreasing prevalence. Most of the bones are on or just above the floor of a ground-storey room. The presence of a few bones in Room 27a is attributed to movement by carnivores during this intrusion or subsequently by burrowing animals. The damaged bones from Rooms 15b and 19a are located within or near animal burrows. Structure 15 has no PIII mortuary contexts and so their Pueblo III ISE could have originated in the South Suite or an unexcavated room. These data also signal that carnivores did not gain entrance to STR 17, which was accessible by hatchway only. It is also emphasised that none of the several hundred *in situ* bone in that room has carnivore damage.

Table E.6: Carnivore damaged elements by Wallace Ruin structure, by prevalence and including conjoined

Structure	Number	N Damaged	% Damaged
26	115	50	0.43
18	221	89	0.40
19	7	2	0.29
27	44	9	0.20
5	256	34	0.13
7	33	4	0.12
15	13	1	0.08
6	447	12	0.03
9	31	1	0.03
8	40	1	0.03
17	169	0	0.00
30	2	0	0.00
1 (kiva)	1	0	0.00
Total	1379	203	0.15

Even though North Suite Structures 5, 6, 8 and 9 contain re-deposited ISE with carnivore tooth marks, the prevalence of such damaged bones is comparatively low. Most of the damaged bones are in Room 5a. Affected bones in that room include small bones of the extremities, vertebrae, scapulae, hip bones, long bones, and a few isolated cranial elements belonging to a minimum of five individuals. It is unknown if P3WR elements in Structure 7 were accidentally dropped as re-buriers transported bones to the North Suite or if they were moved into this adjacent structure by burrowing animals.

EVIDENCE FOR INTER-SUITE RE-DEPOSITION OF ELEMENTS

Bruce Bradley concludes that the disordered human remains in Rooms 5a, 6a, 8a, and 9a represent an assemblage of bones transferred by humans from carnivore-disturbed primary burials in South Suite Rooms 18a and 26a. This is a reasonable interpretation on two accounts. The first is that many bones in each location evidence carnivore toothmarks. The second is that these North Suite rooms would have been inaccessible to carnivores; the ground-storey was entered by ladder through a single hatchway, with cover in place at discovery.

The view that these rooms served as the subsequent depository rather than the locus for primary burial is corroborated based on several lines of evidence. On the other hand, while the finding that the bones originated in the South Suite is sensible, it may be that some or all came from unexcavated rooms beyond the West Arm. Such case would signify an even more pronounced scale of room use than is currently known. That North Suite remains came from a room floor MCT is suggested by their good to excellent bone surface preservation, which is equivalent to those from *in situ* burials in Room 17a. Hence, the occurrence of inter-suite element re-associations would provide stronger evidence for a disturbance-redeposit relationship. In the analyses described below, matches include paired elements, or antimeres, as well as secure re-associations involving the sacral-iliac joint. Links are identified through osteometric sorting (Byrd and Adams, 2003), visual assessment of morphognostic features, and femur/acetabulum articulation (Ubelaker, 2002). The extremities, ribs 2-12 and vertebrae are excluded from consideration due to loss of articular regions from carnivore damage (especially vertebrae) or insufficiently distinctive morphology in youthful remains. First ribs are acceptable due to their idiosyncratic morphology, even in very young individuals. An exception was made regarding matching attempts involving North Suite vertebrae with distinctive osteoarthritic lesions to South Suite elements, but no vertebrae from that locus evidences similar pathology. In the nomenclature used here, antimeres are designated by element type, as in Femur Link, and contiguous bones, such as an Os coxae and femur, comprise a non-pair Link (NPL). Due to anatomic complexity, cranial elements or fragments are referred to as a Cranial Link, regardless of developmental status (fused or unfused elements). For clarity's sake, specimen identifications are used in text when relevant. These designations begin with the room number, followed by the sequential number assigned when inventoried.

A total of 269 West Arm bones are sufficiently intact for reliable re-association appraisals. This tally includes just three intrusive bones from Room 17a since the post-deposition disturbance in that room is unrelated to the carnivore intrusion into the building. Table E.7 reports results for 71 Links comprised of major bones (limbs, ossa coxae, scapulae) at three scales: inter-suite (between suites), intra-suite (within suite) and room (intra-room). The destruction of long bone ends and skeletal regions of distinctive morphology are impediments to element matching, and they compromise attempts to re-associate contiguous long bones. However, shaft morphology is usually sufficiently distinct to eliminate unsuccessful matches. Cranial elements are rarely suitable, except for Cranial Link 145. In these evaluations, the South Suite inventory includes all P3WR ISE from the south half of the West Arm (and Annex) on the chance that such remains originated in that complex. For reasons noted above, Structure 7 elements are grouped with North Suite ISE.

Inter-suite re-associations are extremely rare (3%), with just two sets. Fibula Link 109 (6.109 and 19.734) is a probable re-association based on equivalent partial epiphyseal union attributes and shaft morphology. Osteometric sorting is not possible since the distal end of 19.734 was removed by carnivore gnawing. The second set consists of five refitting fragments to Cranial Link 145, though three other fragments may belong to it as well.

The location of a Link 145's frontal fragment on the re-disposal level of North Suite Room 6a is crucial due to the reliability of the re-association and the presence of multiple bones from this calvarium at both ends of the West Arm. In addition, this re-association involves the perfect conjoining of the robust cranial fragments rather than an inference based on morphological similarity. Figure 14.3 provides a photograph of these elements, which are labelled by room and suite. This figure also includes a plan map of the West Arm, in which observed horizontal locations are starred. The exception pertains to 7.1312 since its location was not specifically described other than by stratum and association with an animal burrow. The right side of the frontal (6.145) is amidst commingled elements on the re-deposit level of Room 6a. The left side of the frontal (7.1312) is in an upper fill unit of Room 7a, but within an animal burrow that traverses all Structure 7 strata. Two conjoining temporal fragments located just above the ground-storey floor may be to Link 145 based on similarity of size and surface condition, but they do not conjoin with 7.1312. All three STR 7 cranial fragments are definitely intrusive since the only primary burial in STR 7 is a Pueblo II infant (HR 7) on the ground-storey floor. South Suite elements from this fragmented calvarium comprise a left parietal fragment (18.988) on the 18a/26a doorway sill and two right parietal fragments (27.1276 and 27.1846) adjacent to the 26a/27a doorway, within fill layer Strat 4. A parietal fragment (26.1292) of similar size and surface condition to these is in Room 26a, but it is not included in Cranial Link 245 since it does not conjoin.

Table E.7: Re-associated P3WR major bones in contexts associated with the carnivore intrusion into the great house, by study unit and Link type.

	Antimere	**Non-pair**	**Cranial**	**Total**
Inter-Suite, S-N			1	1
Intra-Suite, South				
18a-27a	1			1
Intra-Suite, North				
5a-6a	2			2
5a-8a	2			2
5a-9a	1			1
6a-8a	3			3
6a-9a	0			0
8a-9a	1	1		2
6a-7a			1	1
Intra-room				
5a	12	3	1	16
6a	15			15
17a	7		3	10
18a	12	1		13
26a	1			1
27a	1		1	2
30a			1	1
Total	58	5	8	71

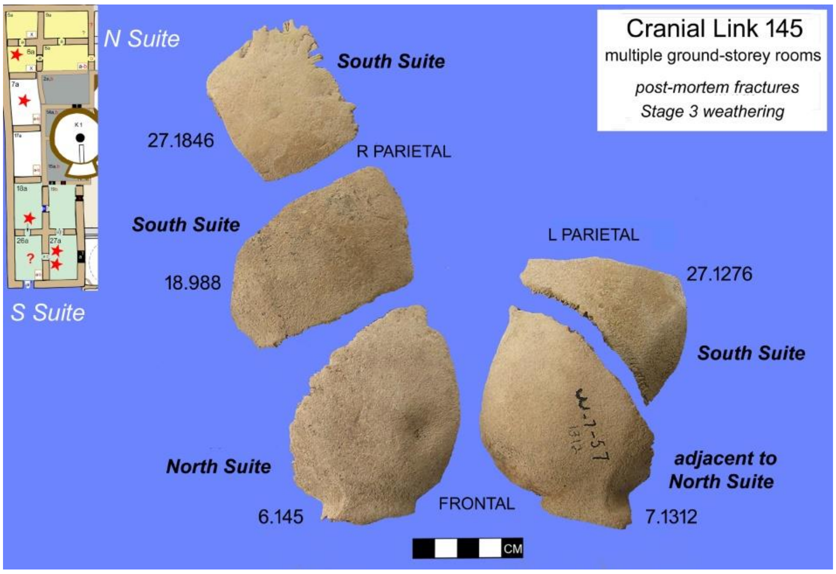


Fig.E.3: Conjoining fragments to *Cranial Link 145 and location by ground-storey room.*

All fracture edge characteristics are consistent with dry-bone damage, probably incurred during structure collapse. In contrast to the excellent condition of the inner table, the outer table of most of the fragment exhibits such Stage 3 weathering attributes as fibrous texture, extensive exfoliation, and rounded fracture edges (Behrensmeyer, 1978); the less affected bones have the same colouration but show Stage 2 attributes. Such taphonomy indicates that the ectocranial damage occurred when the cranium was still intact and when these fragments were still within the same micro-environment. The occurrence of just three weathered bones (1%) with Stage 1 attributes in Room 6a indicates that the ectocranial deterioration of fragment 6.145 did not occur in that chamber; this is not unexpected considering the excellent preservation of its ceiling.

To summarise information presented in the Structure 6 life history, the thick adobe layer, underlying strips of cedar bark and most of the beams that supported the upper-storey floor (Surf 1) of Room 6b were intact at discovery though the mid-section was slightly slumped. There is no hatchway. West Arm Phase 3 hatchways are uniformly in the southeast corner of a room. The intact southeast quadrant of the Room 5b floor has no hatchway. This means that access to Room 6a from a point beyond the Suite required transit through Room 8a. Based on the available evidence, Room 8a could be entered only through the floor of upper-storey Room 8b, and the only known entrance into the Suite is via the doorway in the east wall of Room 8b. Possibly, 8a may have been accessed through Room 9a, if the since deteriorated floor of Room 9b had a hatchway. Regardless, either hatchway entrance would have required transit through Room 8a. The ground-storey wall shared by Rooms 6a and 7a has no missing wall stones or interconnecting vent holes or beam sockets.

The potential for the intra-suite circulation of bones is acknowledged, and the occurrence of a few scattered ISE in Structure 6 and 8 fill strata are interpreted as the movement of bones from the re-deposit surface to a higher elevation by burrowing animals. The possibility of a direct connection between Room 6a and Structure 7 can be eliminated on archaeological grounds. Yet, the possibility that a burrowing animal moved 6.145, and perhaps other bones above Suite deposit surfaces, to Room 6a via a circuitous route through Structure 8 cannot be dismissed outright. For simplicity's sake, two scenarios provided in Table 14.7 summarise the steps involved in terms of intentional actions of humans versus random effects of animal behaviours. These situations pertain only to the movement of Link 145 bones within the north end of the West Arm and do not address the origin of these intrusive elements, there being no adult primary burials in any of these structures.

Of these two possibilities, Scenario A's interpretation of human agency provides the most parsimonious explanation since it rests upon ample empirical evidence. The presence of some 800 re-deposited elements and the careful arrangement of iLink 326 bones demonstrates that ground-floor accessibility was quite feasible for humans, despite some logistical complications. Tight clusters of commingled ISE from multiple age groups suggest transport of elements within corpse wrappings or containers, possibly including basketry.

Scenario B is not impossible, but the steps involved are based on assumptions rather than direct evidence. No animal burrow remnants were observed between Room 7b and Structure 8 or within Structure 8. It also requires acceptance of happenstance that 6.145 finally came to rest at the exact elevation as hundreds of ISE. In contrast, the location of 6.145 on the deposit surface is not indicative of animal burrowing, as it would be if in a higher elevation. The question of the origin of Link 145 bones is addressed in the section pertaining to South Suite re-associations.

Table E. 7: Two scenarios regarding the location of Frontal fragment 6.145.

A. Frontal 6.145: re-deposit by humans	*B. Frontal 6.145: Re-location by animals*
1. Two conjoining frontal fragments transferred to the North Suite/Structure 7 vicinity by humans.	1. Two conjoining frontal fragments are transferred to the North Suite/Structure 7 vicinity by humans.
2. Frontal fragment 6.145 is re-deposited in the NW quadrant of Room 6a, at the same elevation as some 500 ISE:	2. Collapse of roof and west half of Room 8b upper-storey floor; the upper-storey floor of Room 6b is fully intact at discovery.
through doorway, east wall of 8b;	3. Fill strata develop in Rooms 8a and 6a.
down through the 8b/8a hatchway;	4. Frontal fragment 6.145 is moved from Structure 7 into 6a by burrowing animals:
across the ground-storey floor of 8a;	
through the 8a/6a raised-sill doorway;	over to STR 8;
across 6a, near NW corner;	downwards through 8a fill;
re-deposited on 6a floor fill.	through the 8a/6a doorway; open or filled (sill is approx.40 cm above floor elev.)
3. Frontal fragment 7.1312 is dropped on/near Structure 7.	across 6a, near the NW corner
	downwards to floor fill elevation and amongst commingled ISE.
	5. Frontal fragment 7.1312, and two more cranial fragments possibly to Link 145, remain in STR 7.

Ultimately, even though the distribution of Cranial Link 145 provides reasonable evidence for the transfer of bones across the West Arm by humans, the dearth of inter-suite matches provides scant evidence that all, many, or just some North Suite bones originated in the South Suite. Another good possibility is that most of the North Suite bones came from other, unexcavated great house rooms. On the basis that this meagre result may reflect methodological limitations, it is worthwhile to evaluate the potential for successful identification of paired sets within rooms and by suites.

South Suite

A total of 17 sets of antimeres (or conjoined fragments) are identified from the 103 major, suitable bones allocated to the South Suite. Both sexes and all age groups except infants are represented. The total prevalence of paired bones in the South Suite (34%) is substantially higher than the West Arm (inter-suite) rate of 3%. All but two bones (1 set) involve intra-room matches (32%). The large majority (76%) of the inter-room sets belong to iLinks 835, 836 and 867 of Room 18a. In marked contrast, Rooms 26a and 30a have just one re-association each, whereas 27a has two. The intra-room re-association prevalence for Room 26a is 11% (2/18) whereas that of Room 27a is 36% (4/11), though just 18% when Radius Link 1135 is not included. The paired bone determination of Os Coxae Link 1038 (26.1038 and 26.1290) is conclusive, as is the conjoined fragments to Cranial Link 145. The identification of Radius Link 1135 (27.1135 and 27.1284) is probable. Two refitting cranial fragments from an adult cranium from Room 30a are from a wall fall stratum and the only ISE from that room; duplication of the left parietal excludes re-association to Cranial Link 145, and the cranium of the only primary burial (HR 17) is intact.

Considering the probable entry by carnivores through the exterior doorway of Room 26a, a reasonable expectation is that canids circulated skeletal elements through open doorways between South Suite rooms as part of their scavenging behaviour. The skeletal evidence provides scant support, with just two matched sets from two, or possibly three, different rooms. The very low inter-room rate of occurrence (2%) thus mirrors the West Arm, inter-suite rate. One of these sets comprises two fragments to Cranial Link 145; if a non-conjoining cranial fragment of similar appearance is included, then three fragments are dispersed through three South Suite rooms. The second set of paired bones comprises the positive re-association of two fibulae from Rooms 18a and 27a. Skeletal development is consistent with an older adolescent or young adult; based on maximum length, left Fibula 18.5.797 is too short to belong to Link 867, who is instead represented by left Fibula 18.5.781. Since there are no other primary burials of this age in Room 18a, the inference is that Fibula 797 was transported into Room 18a; the same argument applies to its antimere 27.115.1138 of 27a. A reasonable interpretation is that both fibulae came from a disturbed primary burial in Room 26a, considering that this chamber is the nexus for the discovered locations of these two bones. No bone or fragment from either of these matched sets has obvious evidence of carnivore damage. It is unknown if the movement of the fibulae involved transportation by carnivores or subsequent animal burrowing. Unintentional re-deposit by humans is also possible considering the potential for confusion as they tried to make sense of a trying circumstance. The presence of Link 145 cranial fragments in a 27a fill unit that post-dates the scavenging event indicates that they were moved into this room by burrowing animals.

The chance that three or four Link 145 fragments were dispersed across three South Suite rooms from an unexcavated great house surface room is slight, given the relative isolation of this suite from the nearest of those rooms. The dispersal of Link 145 elements to both ends of the West Arm from a point exterior to this architectural unit is even more unlikely, as is the potential that burrowing animals moved several calvarium fragments across the length of the West Arm from either a north or the south provenience. The fragment in the 18a/26a doorway is arbitrarily assigned to Room 18a because that chamber was excavated prior to Room 26a. This means that, effectively, three (two-storey) structures with no south wall passageways in intact ground-storey walls are betwixt the Room 6a fragment and fragment 18.988.

All in all, the evidence points to a South Suite primary deposit location for the adult male represented by Link 145. The only adult male *in situ* burials in the entire West Arm (and Annex) are in Room 17a (HR 4) and 27a (HR 11). For reasons provided elsewhere in this chapter, the disturbance and removal of HR 4's cranium from Room 17a occurred in a separate episode that post-dates the carnivore intrusion, perhaps by decades. Cranial elements of HR 11 duplicate all Link 145 fragments. The morphological robusticity of Cranial Link 145 is comparable to that observed in two South Suite non-pair humerii (26.1006 and 27.1115), a femur (27.1281) and a mandible (26.1071). Hence, the inference drawn is that the intact Link 145 cranium was located within the South Suite, exposed to the elements, fractured, and then some fragments were taken to the North Suite during the re-deposit effort while others remained within their original, South Suite provenience. Excavation of the adjacent Pueblo II kivas may eventually prove otherwise, but in terms of the available evidence, the likelihood is that Cranial 145 came from a disturbed primary burial in Room 26a.

North Suite

The 164 major, suitable bones from the North Suite (and STR 7) include a total of 41 sets of antimeres and non-pair links. All four age groups and both sexes are represented. The total prevalence of Links (52%) is the highest of the great house study unit configurations, including the 26:58 (45%) proportion regarding pairs to suitable elements observed in Room 18a. Antimere links include all six long bone types (18), clavicles (6), os coxae (1) scapulae (3), and 1st ribs (5). Cranial Links include articulating cranial vault elements from two infant crania

(Links 157 and 1875) and adult Cranial Link 145. Non-pair links consist of the cranium and mandible from iLink 326; NPL 48 comprises the sacrum (Room 6a) and left os coxae and femur (Room 5a, NPL 265) to iLink 326; a pelvic girdle and right femur from a young adult male (NPL 269); and, the sacrum and os coxae from an elderly female (NPL 266).

All but two Links involve a bone from the much larger skeletal deposits within Rooms 5a and Room 6a. As is the case for the South Suite, pair matches within rooms are much more common than inter-room re-associations. Intra-room sets (31) comprise three quarters of the North Suite re-associations. The number of bones involved in any type of re-association is essentially equivalent in Rooms 5a (16) and 6a (15), though Links are more prevalent in Room 5a (50%) than in 6a (21%). This is probably due to a general difference in element size: larger elements are more commonly found in Room 5a, whereas 6a contains the greatest number of bones from the extremities. Whether this represents intentionality on the part of the depositors is unknown. It may simply mean that larger bones were gathered first and deposited within the least accessible, and thus most secure, of the ground-storey rooms.

The intra-suite links include all suitable element types, with the 20 bones distributed among nine sets of antimeres, two cranial links (including Link 145), and the left os coxae (5a) and sacrum (6a) of iLink 326. All matches involve a good or high level of confidence, but three more probable antimeres are excluded since the extent of damage precludes a secure determination. Intra-suite links (proper) involve all combinations of rooms except for matches between Rooms 6a and 9a. The left frontal fragment (7.1312) of Cranial Link 145 is the only STR 7 bone that matches to a North Suite room. Although these inter-room matches are few, they are sufficient to determine that all bones were deposited within these four rooms in response to a single event.

INTERPRETATIONS

Based on the number of successful intra-room matches in Room 18a and North Suite intra-room and intra-suite matches, it seems that the dearth of re-associations between the two suites is not directly attributable to factors pertaining to re-association methods or element condition. The high prevalence of pair-matches Room 18a is not unexpected, in that the more than 80% of the bones associated with Surf 2 belong to three individuals in their chamber of primary burial deposit. The smaller number (104 v. 164) of South Suite bones to draw upon for pair-matching attempts may be a factor in the lesser number of inter-suite matches compared to North Suite results, as might be the slightly inferior prevalence of complete or intact bones (61% v. 81%) compared to North Suite bones.

There are several plausible reasons for the scarcity of pair-matches between these suites. Despite the greater number of suitable bones in the North Suite, its 12% prevalence of inter-room pair matches is not much higher than the 2% rate for South Suite re-associations. This difference is not significant, especially when considering the effect of damaged elements on successful pair-matching attempts. Yet, on occasion, even fragmentary bones retain sufficient distinctive morphology for pair-matching. As can be seen in the Figure E.5 photograph below, most of the iliac blade of right ilium 18.944 was destroyed by carnivore gnawing; however, sufficient auricular surface morphology remains to exclude this bone as the antimere of left ilium 27.1136.

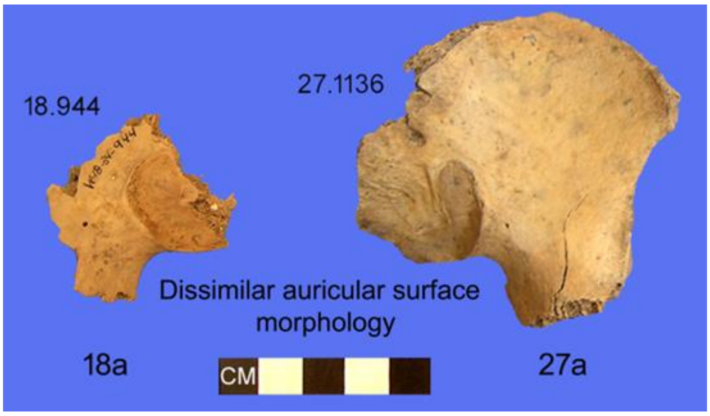


Fig. E.5 Left and right ilia of similar size but from different South Suite children.

Methodological limitation may be involved since the ability to re-associate multiple paired P3WR elements to a single individual is rare. This means that it is not possible to connect a South Suite humerus with a North Suite femur from the same individual. The ability to segregate multiple antimere types to a specific 18a iLink was enabled by the very small number of disturbed primary burials in that room. Yet, even though long bone sets could be discriminated on the basis of slight difference in size, they cannot be specifically allocated to the children represented by Crania 835 and 836.

Perhaps the most salient impediment to pair-matching within and between suites is that, as the locus of intrusion, many South Suite elements were probably not available for collection and re-deposition: scavenging animals either destroyed them or removed them from view to a location well beyond the great house. The skeletal representation of the three iLinks in Room 18a gives significant credence to this possibility. Even though associated material evidence points to primary deposit within Room 18a, only 33% of their expected bones are present. The three skulls lack only one mandible, and 86% of the lower limb long bones versus 50% of the upper limb long bones are present. Otherwise, the torso and extremities are poorly represented, particularly in the case of the two young children (iLinks 835 and 836) who are each about six years of age. Whether the single subadult ulna (18.863) and radius (18.864) are from one young child is unknown, but as documented in the Figure E.6 photograph, carnivore chewing damaged the still-green ulna considerably. The skeletal representation evidence offered in Figure E.7 allows for the possibility that corpse decay was incomplete in their cases. The extent of damage to ilium 18.944 from carnivore gnawing certainly supports this interpretation. Their combined skeletal representation of 19% is very low, even when compared to the third individual, adult iLink 867. Cranial element and lower limb occurrence are very close to the expected numbers of bones, though the fact that each cranium was articulated may have reduced the opportunity for damage by scavenging canids. Upper limb representation is marginal in contrast to the virtually complete sets of lower limb bones

Fig. E.6: Carnivore-damaged radius and ulna allocated to iLink 835/836 of Room 18a.

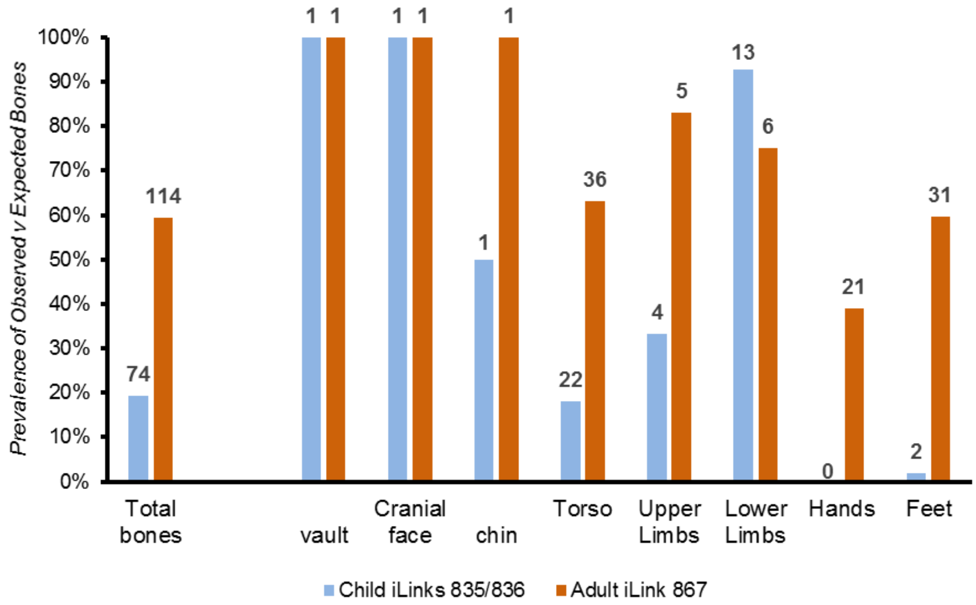


Fig. E.7: Observed versus expected skeletal representation of child iLinks 835/836 and adult iLink 867 of South Suite Room 18a

Also worth mentioning is that iLink 835/836 extremities are represented by just two tarsals, ribs (heads) number just 9 of the 25 in Room 18a, and a mere 3 of the 23 iLink vertebrae have juvenile attributes. Possibly, some of these bones were transported into other Suite rooms by animals. However, only eight South Suite hand bones have the size and development of young child. The only other South Suite vertebrae are in Room 26a, but these comprise the unfused arches and centra of an even younger individual.

Lotan (2000: 422) surmises that the disappearance of juvenile bones from young calves is partly attributable to the destruction and consumption of cartilaginous bones with low structural density by carnivores. Such could be the case for these small and immature iLink bones. An additional possibility is that relatively intact hand and foot bone units still connected by soft tissue were removed to a location outside of the building. Whether these tissues were still relatively fresh or comprised naturally mummified anatomic units is unknown. Recovery error during research excavation is not a consideration since many small bones were frequently located in place and, also, all strata containing human bones were sifted during excavation.

Ultimately, the question of scale of use by number of rooms for primary burial deposits is unresolved. Bradley's interpretation may be correct: all North Suite bones originated in disturbed South Suite burials. Such a conclusion rests primarily upon a "common-sense" argument regarding bone condition and taphonomic similarities. The distribution of Cranial Link 145 elements signals that there was some measure of connection between these two suites, but firm evidence for the scale of use as inferred by Bradley is not supported by pair-matching evidence. On the other hand, considering the factors noted above, the absence of such evidence may not be meaningful. Considering that Room 18a was less accessible than 26a, the very poor representation of Room 18a iLinks further emphasises that South Suite skeletal representation is severely affected by carnivore scavenging.

Logistics of moving bones from the South Suite to the North Suite

As illustrated in the Figure E.8 plan of the West Arm, there is no direct route between the two suites, either through ground or upper-storey floors. To review, the credible interpretation is that the now-plugged T-shaped doorway in the south wall of Room 26a was open at the time of the carnivore intrusion. The only other exterior entrance to the South Suite that may have been open during this episode is the (now) plugged upper-storey doorway on the east wall of Room 19b. There are no upper-storey doorways in the most western alignment of structures (5-26) or between Rooms 2b and 8b. All doorways north of Structure 19 were deliberately walled-in, or plugged, with masonry when discovered. The timings of these actions in the South Suite are unknown, but even if it did not occur until after the carnivore intrusion, the insertion of the Kiva 1 prevented N-S access through the upper-storey floor. Possibly, the east doorway in 19b was walled-in during Pueblo II times when the (unexcavated) adjacent two-storey kiva was erected. The only intramural hatchway in the South Suite is within the upper-storey floor of Room 26b (Surf 1), but this passageway was blocked once the dismantled upper-storey roof was, apparently intentionally, dropped directly onto Surf 1 during the Pueblo III Period.

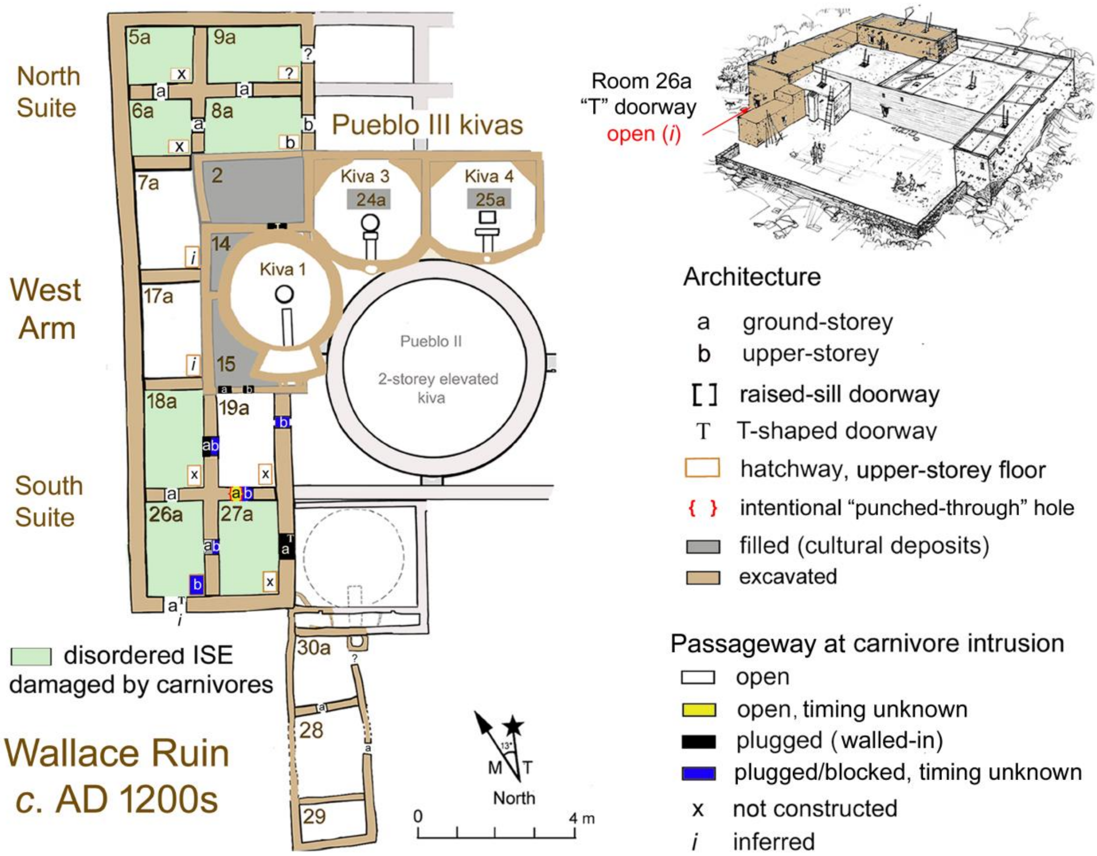


Fig. E.8: West Arm passageways at the time of the intrusion by carnivores, in relation to the disordered skeletal remains in the North and South Suites. Peterson's (1989) artist's reconstruction (amended by B. Bradley, 2015) illustrates the logistics involved in transferring bones to a different section of the two-storey great house via exterior routes.

The timing of this blocking relative to the carnivore intrusion is indeterminate. The roof hatchway in Peterson's reconstruction represents artistic license. Potentially, if the 26b hatchway was present and accessible after all, upon reaching Room 26b via 26a, the roof could have been accessed through a hatchway in Room 26b, or even 27b or 19b if those doorways were also open at that point. The condition of the third storey of the original great house by the AD 1200s is unknown; a passageway in a north wall is very uncommon in Regional sites and at Chaco Canyon. On the other hand, there is a T-shaped doorway in the north wall of the Structure 14, but it was plugged during Pueblo II times. No passageways are in the north wall of the two lower stories of Structures 24 and 25; both second-storey rooms were modified to function as intramural Kivas 3 and 4 during construction Phase IV. The circulation pattern within the upper-storey rooms of the North Suite is unknown, as is whether any room had a roof hatchway.

Thus, from current evidence, the only pathways from Room 26a to Room 8b involved exterior routes around the west side of the building or over the roof, and perhaps navigation around third-storey structures. Either direction required the use of a two-storey ladder or two one-storey ladders. Access through the unexcavated, two-storey central section of the building is a distinct possibility, but this too would have required a ladder to reach the upper-storey entrance in the east wall of Room 8b. The presence of weathered ISE on Structure 18 roof fall and within upper strata of Structures 26, 17 and 7 are consistent with the notion that some ISE were transported from the South Suite via the roof. The reality is that multiple routes could have been used, especially if the North Suite contains ISE from unexcavated rooms.

Post-deposit Interval (PMI): *Decomposition Variables*

The Wallace Ruin bones could have been scavenged at any time during corpse decomposition, especially if cadavers were at various stages within this potentially quite prolonged process, depending on the types and co-occurrence of decomposition variables potentially present within the great house. The University of Tennessee's Anthropology Research Facility, established by William Bass in 1980, is probably the most widely recognized outdoor facility for controlled scientific research on human corpse decomposition. The data collected by researchers from that facility, in addition to contributions from studies in other regions, demonstrate that the time required for skeletisation is variable depending on internal factors associated with corpse decomposition and external factors related to the deposition environment (Bass, 1996; Galloway et al., 1989; Catts, 1992; Dent et al., 2003; Haglund and Sorg, 2002; Mann et al.,1990; Micozzi, 1997; Simmons et al., 2010).

Decomposition factors pertaining to the physical state of the individual at death include illness associated with high physiological temperature, body size and weight, and traumatic injury resulting in a deep wound that breaks the skin. Matters external to the corpse are more often noted, or at least reported. This long list of variables includes climatic temperature, humidity, elevation, exposure to the elements versus a protected location, differences in oxygenation (aerobic v. anaerobic conditions) and bacterial loads associated with interment involving direct contact with soil compared to placement within a casket, substrate type (soil acidity), depth of burial, deposit within a mass grave, and the covering of the body with cloth or other materials. Additional factors consist of carrion insect activity, carnivores, movement of the corpse, seasonality, and an individual mortuary context versus position within a mass grave. However, a common point of emphasis is that temperature is the most critical since it controls the speed at which biochemical reactions occur as well as conditions suitable for insect colonisation, another crucial factor affecting the rate of decomposition (Simmons et al., 2010:889). For example, cold conditions slow or halt bacterial and enzymatic reactions until the temperature rises sufficiently to restart the decomposition process (Micozzi, 1997). In contrast, a corpse located within a structure where climatic conditions are relatively constant will progress through these stages in a gradual sequence (Ritchie, 2005); more-so if insects cannot enter the building (Simmons et al., 2010:889).

Cold weather may also reduce opportunities for insect colonisation. by Anderson and Cervenka (2002) report that blowflies (Diptera:Calliphoridae) are the first insects to be attracted to a fresh corpse. They will lay eggs within bloody tissue, mucosal regions or body fluids within a matter of hours, and may continue to do so repeatedly over the next few weeks. The common blow fly species in Colorado consist of greenbottle flies (*Lucilia* spp.), black blow fly (*Phormia* regina), and various Calliphora species. These insects thrive in the warmer months, and while adults may inhabit heated houses during winter, they do not reproduce during these cooler months (Cranshaw and Peairs, 2009).

Since diverse environments yield different rates of decomposition, Galloway (1997), among others, emphasizes the need to develop PMI standards for geographic regions. Tersigni-Tarrant and Shirley (2013) provide an overview of the development of outdoor research facilities for forensic research in the years in warm, humid Tennessee. Other centers have been established in southern West Carolina University, North Carolina (mild, mountain); Texas State University, San Marcos, Texas (warm, arid). The Southeast Texas Applied Forensic Science Facility (hot, humid) can simulate different environmental conditions, in addition to conducting outdoor research. The outdoor facility at Colorado Mesa University's Forensic Investigation Research Center in Whitewater, Colorado has the dry, high-altitude climatic conditions closest to those of southwest Colorado. Even so, temperature extremes are not as pronounced as those in the Four Corners; moreover, data regarding human remains are not yet robust since the first human body was placed, outside, as recently as 2013. There is no such facility in southern Arizona, but Gallway's (1989) retrospective study of 189 forensic cases is an oft-cited resource regarding corpse decomposition in a hot, arid environment.

Thus, despite the emphasis on data collection under controlled conditions, there is no close corollary to the environmental conditions and mortuary context within the Wallace Ruin great house. As in the research of Dent and colleagues (2004), most studies limit consideration of decomposition within an open space to the use of a casket within a grave. Although Galloway and co-authors (1989) consider decomposition rates within a structure, their case study involves conditions occurring within the extremely arid and hot climate of southern Arizona. Southwestern Colorado is semi-arid, however, it is substantially different in that the average temperature is much colder, and for long intervals.

Although Nordenskiöld's (1979 [1893]) descriptions of cadavers observed during his 1891 field work in the newly-discovered ruins of Mesa Verde are not part of a formal actualistic or retrospective study, his close observations nevertheless provide a useful example for consideration of preservation variables within the Mesa Verde Region. He reports several well-preserved Pueblo III cadavers from Step House, an east-facing cliff-dwelling sheltered within a large, natural alcove. Each is in a subsurface pit situated towards the rear of this deep overhang, and are thus in protected locations that are perpetually dry and often cool or freezing. Nordenskiöld (Ibid., 39) describes a mummified adult within one such grave. An associated Mesa Verde Black-on-white vessel (1983: Plate XXVI, 3) indicates a date of deposit c. AD 1180-1280, so at least 600 years prior to this account:

> The head had been covered with a skin cap, the feet with moccasins or shoes of the same material. …The corpse was wrapped in a kind of net of cords, spirally wound with strips of hide, on which hair was still partly preserved. These cords were further held together by strips of yucca leaf, under which thick branches of cedar had been inserted. The entire absence of moisture had presumably been enough without further preparation to transform the corpse into a mummy. All the soft parts were completely dried; the hair, which was black and rather coarse, still hung to the head. Under the mummy lay a mat of withes, similar to that described in the account of the preceding grave. The head rested on a short, rounded block of wood. A mat of the same kind as the one under the corpse had finally been spread over it.

It seems that these cloth and soil coverings effectively blocked insect infestation of the corpse. This factor probably accounts for a large measure of this degree of corpse preservation, which is admittedly very rare in the MVR. However, it also effectively demonstrates that within this region's cool, dry climate, the right combination of factors can interrupt full skeletisation on the scale of centuries.

Decomposition variables at Wallace Ruin

Although the stages of decomposition follow a specific sequence unless interrupted by extreme heat or cold, there are significant points of difference between these studies and conditions at in the Wallace roomblock. In the studies referenced above, cadavers were either found or placed in outdoor settings in temperate climates, and each had been dead for less than five years. In contrast, the Pueblo III remains from Wallace Ruin rested upon the earthen floors of ground-storey rooms within a substantial two-storey building constructed of thick masonry walls. For six months of the year or more, freezing and extreme sub-freezing conditions are typical overnight conditions in the semi-arid, high-altitude environment of southwest Colorado; furthermore, daytime temperatures can plummet to below 5° even in July, the hottest month of the year. Thus, and judging from personal experience during great house excavations, conditions within the ground-storey rooms would have been cool for most of the year and freezing for prolonged periods of time. The probability is high that the corpse decomposition process would have been delayed or halted any number of times.

Season of death would play another large role in decomposition variables at Wallace Ruin, since both extreme cold and drier conditions will reduce the potential for insect colonisation (Anderson and Cervenka, 2002:174). Moreover, experimental studies demonstrate that the refrigeration of maggots will halt development immediately (Ibid.:181). Blow fly casings from the torso region of HR 6 (R. 17a) indicate that temperatures were not so low as to necessarily preclude invasion of the corpse by insects. However, whether this happened before or after deposition is unknown.

Yet another complication concerns the use of clothing or wrappings, which can delay decomposition considerably (Roksandic, 2002:99). Apparently, this is because coverings can protect the body from subsequent insect invasions even if blow flies manage to lay eggs in the corpse prior to covering. The laboratory and field photographs compiled in Figure E.8 document observable organic wrappings associated with four *in situ* primary burials deposited on a Wallace room floor. Two individuals (HR 3 and 4) have remnants of woven cloth that are indicative of shrouding. Three individuals (HR 4, HR 5 and HR 10) are lying upon or over woven willow mats. The preservation is insufficient to determine if the mats enclosed these individuals, but the locations of the surviving cloth indicate that the corpse of HR 3 was completely enwrapped at deposit.

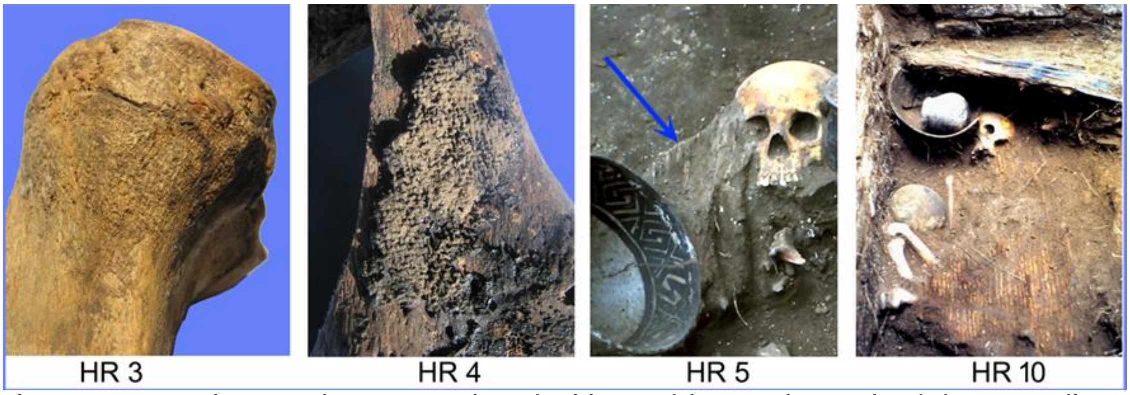


Fig. E.8: Organic coverings associated with Pueblo III primary burials on Wallace Ruin floors. HR 3 proximal tibia and HR 4 distal femur: woven cotton cloth; HR 5 and HR 10: woven willow mats overlying in situ skeletal remains.

It also seems that the intentionally disturbed, skeletonised remains of HR 11 were associated with at least one organic barrier at primary deposit. Bones in direct contact with base of the subfloor burial pit (27a) are poorly preserved, so the absence of direct evidence of organic wrappings is to be expected. Anatomic connection evidence was eliminated when intruders removed all bones superior to the lower limbs. Yet, non-perishable artefacts provide good indirect evidence that during primary deposition, this adult male was positioned upon a sturdy organic object, such as a woven mat, animal hide, or a bark mat like the one in Room 18a. Four sets of carefully arranged and closely-spaced arrowhead groupings are in direct contact with the bottom of the pit in several locations in the region of the torso (Groups 2-4) and underneath or near the original location of the (re-deposited) cranium. Each set is undisturbed, even though all skeletonised elements superior to the lower limbs were removed from the pit by human intruders. In contrast, 21 more arrowheads are mixed in with those disordered bones re-deposited into the pit at the end of the intrusion event. For clarity’s sake, Bradley’s drawings of the precise arrangements of these sets accompany the field photograph provided in Figure E.9. The configurations in the drawings are accurate, since one or two points were slightly displaced during excavation. The ease by which these points could be jostled emphasises the improbability that these sets would escape disturbance if they had been directly beneath the skeleton itself.

Fig.E.9: Field photograph of the base of the subfloor burial pit of HR11, documenting the positions of four sets of undisturbed projectile points in relation to disturbed and re-deposited skeletal elements. Ceramic vessels are interpreted as in situ. Drawings of the projectile points and photograph by Bruce Bradley.

The probable explanation is that these points, possibly mounted on arrows (Bradley, pers. comm, 2015), were placed directly upon the pit base, covered with a firm organic barrier, and then overlain by the body of HR 11. At disturbance, this barrier still retained sufficient strength to maintain the integrity of the alignments of these points. Considering that the right femur and every other bone superior to the lower limbs were removed from the pit, the chances are good that the skeletonised remains were still enclosed with shrouding or other such wrappings, and that these may have been used to extract the superior skeleton from the pit. As is observable in Figure E.10, the lower limbs are wedged in place against the sides of the pit, a circumstance that may have prevented their removal and possibly the tearing apart of decomposing wrappings. It seems unlikely that shrouding alone would prevent displacements of these points. The configuration of the clustered bones may mean that these elements were bundled together within wrappings when returned to the pit. The parallel alignments of several long bones may represent an attempt to order these remains, or this arrangement could be circumstantial.

Fig. E.10: *Field photograph of the in situ lower limbs and the cluster of re-deposited bones of HR 11; within his subfloor burial pit (F.7, Room 27a).*

In addition to these, HRs 3, 6, 13 and 14 have verticalisation of the clavicle, or change in the natural angle of orientation, as do Pueblo II HRs 7, 9 and 15. In such cases, the medial end points downward, at an oblique angle, as the lateral end shifts upwards. Duday (2009:45) reports that change from the anatomic horizontal position is the result of transverse compression at the level of the shoulders, and that it only ensues when the body is tightly shrouded or has been placed within an a very narrow coffin or anthropomorphic tomb. The inclusion of this indirect evidence means that at least half (8/16) of all *in situ* primary burials at Wallace Ruin were shrouded at deposit, and about the same number are associated with willow or bark mats. The mortuary microenvironment of HR 11 means that exposure to post-deposit insect infestation would not play a role in rate of corpse decomposition. However, this indirect evidence contributes to the sense that a fundamental mortuary practice at Wallace entailed accompaniment by organic wrappings or protective barriers.

Finally, carnivore scavenging can accelerate decomposition, especially in the case of fresh cadavers. This is primarily because the tearing of soft tissue provides more entry points for insects. Due to the forensic implications, actualistic studies tend to focus upon the interactions between carnivores and cadavers that, at least at the outset, are in a fresh state. Such studies also demonstrate that carnivores may return to disturbed remains again and again over a period of months or years (Lotan, 2000). Although the duration of the canid intrusion into

Wallace Ruin is unknown, it is unlikely to have lasted more than a few months at most even if the great house was used only sporadically.

The upshot here is that it is difficult to estimate how long the post-mortem interval between corpse deposit and disturbance may have been at Wallace Ruin, regardless of the intrinsic factors pertaining to each individual corpse. The decomposition time frame for a large-bodied adult may well have exceeded the five or so years of study in the longer actualistic projects. Yet, the carnivore damage does provide one relative measurement. Decomposition can be malodorous, especially during putrefaction (Lotan, 2000:413). Cadavers that are well-along the Stage 4 interval of active decomposition may have lost most soft tissues yet retained sufficient skin, ligaments, gummy residues or greasy bones to be perceptible to canids' particularly keen sense of smell. It is improbable that canids would have been attracted to corpses by odours emanating from Wallace Ruin had all cadavers attained the 5th stage (extreme decomposition) in which no soft tissue remains and bone is dry. It seems even less likely that just the smell of dry bones would have induced canids to enter a building, though feral dogs may have been less reluctant than wild coyotes or wolves.

Although the movement of ISE to the North Suite by humans may have contributed to some loss of anatomic connections, the evidence overall is consistent with disarticulation Stage 4, or total disarticulation. Only four to perhaps seven articulated anatomic units (AAU) identified in Table E.8 are present among the 1205 skeletal elements from the South and North Suite rooms. All but two involve the vertebral column. Units in direct articulation at discovery comprise just three vertebral sections with a total of 21 bones and the hind-foot with 8 bones in the Figure E.11 photograph; four bones from this foot show unambiguous evidence of canid gnawing whilst retaining anatomic connections. Similarities in size and development suggest that two of the vertebral AAU from Room 5a almost certainly belong to iLink 326, as might the articulated foot; see Fig.5.2, the *in situ* photograph of these three AAU. The single anatomic unit in Room 15b that may have been articulated prior to further disturbance by animal burrowing comprises one forearm and hand unit with eight bones. The evidence from Room 18a is particularly compelling regarding the near-total disarticulation of the cadavers of three iLinks because there was seemingly no effort by humans to place bones on Surf 2 in some semblance of order. The single AAU (870) from that room comprises thoracic vertebrae 3-8 from adult iLink 867.

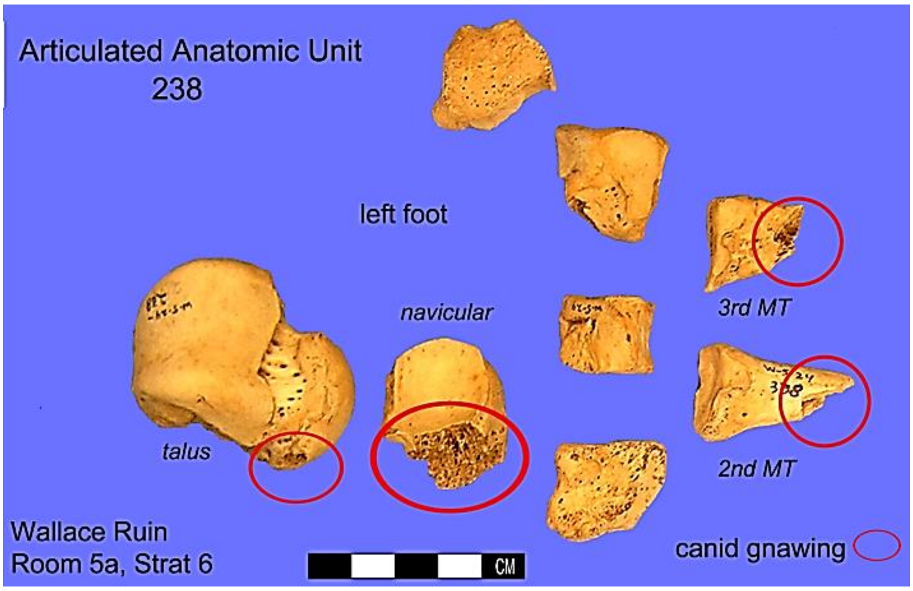


Fig. E.11: Laboratory photograph of Articulated Anatomic Unit 238 showing canid gnawing on bones from a left foot that retained some anatomic connections during and after this event.

When carnivore damage is taken into account, two things come to mind given that the stage of disarticulation is closely associated with the stage of corpse decomposition. The first is that the interval between the deposit and disturbance of multiple P3WR cadavers by carnivores is likely to have been closer to the upper end of Haglund's (1997: Table 1) findings, in which canid scavenging will completely disarticulate a single cadaver within 5 to 52 months. Otherwise, one would expect not only more articulated units but a greater range of anatomic unit types in either room or in the North Suite. Actually, this observed decomposition timescale is likely to have been considerably longer within the open rooms of the great house, in consideration of the likelihood that corpse decomposition was delayed due to pervasive cool to freezing air temperature, the possible absence of blow flies in colder seasons, and the use of mortuary wrappings. As a case in point, if both vertebral articulated units 264 and 1464 belong to the re-assembled iLink 326, then her disarticulation score is Stage 3. Her AMS dates are in the mid-AD 1220s, at the latest. In contrast to the typical 2 to 11 month, Stage 3 disarticulation interval, the post-mortem interval might rather have been years later when allowing for significant interruptions of decomposition.

The other point of emphasis is that the near-absence of articulated anatomic units in Rooms 26a and 18a suggests that neither was being actively used as a mortuary deposit locus in the months or year or so prior to the carnivore intrusion, assuming actualistic studies provide an accurate measure for Wallace Ruin. In such case, no room in the South Suite had been used for this purpose for some time prior to the carnivore intrusion. However, this determination does not negate the possibility that commemoration rituals were held in these rooms throughout this period.

Table E.8: Articulated anatomic units among P3WR ISE, including probable AAU 368 and 1014.

Room	AAU #	N bones	Type
5a	238	8	hind foot
5a	254	4	vertebral column (C2-5)
5a	1464	8	vertebral column (T8-L3)
5a	1486	3	vertebral column (L1-3)
18a	870	6	vertebral column (T3-8)
15b	368	11	forearm and hand
26a	1014	6	vertebral column (3C, 8T and 5 centra)

Conclusions

Analysis of the carnivore disturbed remains corroborates archaeological evidence regarding the locus of intrusion and the minimum number of rooms used for primary burial deposits. Analysis of skeletal representation by suites shows that both contain remains from 10 or so individuals, at a minimum, which is in line with the MNI of 22 derived from isolated bones only. On the other hand, the re-association evidence is insufficient to confirm that all North Suite bones came from South Suite rooms. This means that the Pueblo III scale of use for primary burial deposits by rooms is a minimum of six. Demographic analysis confirms that wherever the disturbed remains came from, the re-buriers collected bones from all age groups and both sexes. Whether they would have been able to identify specific remains as male or female seems unlikely, however, there may have been sufficient visual clues in the rooms used for primary burial deposits. Considering the advanced stages of skeletisation at this incident, and the opportunity to observe the dead in a room floor mortuary context during acts of commemoration, it is quite conceivable that the "redepositers" recognised certain bones as belonging to a specific person. This is the probable explanation for the “re-assembly” of iLink 326 in Room 5a, but there is no obvious pattern otherwise to suggest that re-deposits were ordered or arranged in terms of an age group or element type. Also, it must also be kept in mind that there is a good possibility that some bones many have since been moved about by burrowing animals.

Analysis of the steps necessary to re-locate bones from one part of the building to another provides a line of evidence regarding scale of effort. The steps taken more complicated than was needed if immediate logistics were the only concern. Assuming a South Suite origin for all elements, each could have been re-deposited in secure location in either Room 27a or 18a, since the small doorways in both rooms could be easily blocked. Moreover, the plugging of the 27a doorway after this event effectively sealed off the entire suite, which would have mooted the need to move bones to another secure location. The fact that some bones were left in the Suite may suggest that the decision to seal the exterior 27a doorway was made after many bones were relocated. Alternatively, disturbed South Suite elements may have been sealed within its rooms, with North Suite bones coming from other rooms that could not be secured against further intrusions.

Finally, correlation of corpse decomposition variables with carnivore damage patterns provides a plausible means estimate the interval between deposition and damage, or post-mortem interval (PMI). From absence of AAU, it seems that the South Suite was not being actively used as a mortuary locus by the time of the carnivore intrusion, assuming that these scavengers did not entirely remove the corpses of the more recently deposited from the building. In addition, a 40-50 cm accumulation of cultural fill above the redeposit level indicates that Ancestral Puebloans continued to use the building after this intrusion episode.

APPENDIX F

FURTHER RECONSIDERATIONS: PUEBLO BONITO'S ROOM 33

Akins' 1986 publication on Chaco skeletal and mortuary evidence is widely regarded as a source of compelling evidence for cultural complexity in the Chacoan system. Yet, the rationales for the determination that Pueblo Bonito mortuary evidence signifies a three-tier hierarchy at Chaco Canyon were set forth in the 1984 publication that she co-authored with archaeologist John Schelberg. Although the greatest focus is on associated turquoise and other accompaniments, they identify the plank floor as an indicator of increased energy expenditure in relation to the two "paramount" individuals located beneath (Akins and Schelberg, 1984:92). Yet, they offer no linking arguments in support of their contention that these boards are indeed a significant component of the underlying mortuary contexts rather than those above, or even neither. By archaeological convention, items within five cm (2 inches) are construed as floor-associated. At least two "above floor" remains (Burials 10 and 11) are seemingly within this vertical distance, when accounting for depth of cranium and body. Yet, they pose no argument to reject this potential floor-association as the fundamental, intentional relationship. One wonders if the more conventional interpretation would have been promoted if no objects or lavishly accompanied individuals were below the floor.

Emphases on questions of social status and hierarchy are central to mortuary analyses in the New Archaeology (Binford,1970; Brown, 1982; Saxe, 1971). Considering that "Middle Range research" is integral to this theoretical approach, the failure to apply linking arguments to associate the plank flooring with these two individuals is particularly baffling. In 1984, Akins was a young osteologist with limited archaeological experience, so evaluation of associated architectural evidence would seemingly fall under Schelberg's purview. Presumably, he would have been aware of Pepper's (1920) and Judd's (1964) remarks about Bonitian wood plank technology.

Pepper (1920: 70-71) makes several observations about the crafted pine floor boards in Room 14a (now Room 303c), in which "sides and ends have been carefully ground with sandstone rasps… The construction of floors of this kind is rather uncommon in Pueblo Bonito, due to the fact that the manufacture of boards of this nature was a tedious task…These are found in various parts of the ruin and will be described as the work progresses.” Unfortunately, this last sentence is the final remark made by Pepper regarding wood planks or boards of any type in his comprehensive report on Pueblo Bonito. Though his 1920 publication revisits several Room 33 architectural components previously described in his 1909 monograph, it does not mention a wood floor, boards, or planks. This omission is difficult to interpret. It may be that Pepper believed that he had covered this evidence sufficiently in the earlier report. Another possibility is that he had since changed his mind about what these boards represented. The complete absence of remarks suggests that he no longer considered the boards as particularly significant by 1920.

According to Judd (1964: 82), “hand-smoothed ‘planks’ were a Late Bonitian specialty…[that] may have appeared as floor boards more frequently than we know, but they were also used as lintels or sills for Late Bonitian doors, ventilators, and wall repositories. The Old Bonitians, as far as I may judge, were not workers in wood and the dressed pine and cedar boards we observed in their empty dwellings were probably acquired from the Late Bonitians through trade or otherwise.” Given this insight, it is puzzling that Judd (1954; 1964) did not address the apparent incongruity between an Old Bonitian structure and Late Bonitian planks in Room 33 in his two major works on Pueblo Bonito.

The locations of the worked planks built into Pueblo Bonito floors or sills and kiva wainscotting are plotted in Figure 9x, whereas Table 9x also includes timescales and dimensions. Other than Room 33, no Old Bonito room contains crafted, hand-hewn plank floors. The single plank in Old Bonito Room 323 is associated with doorway remodelling. Room 303c (Pepper’s Room 14a) and Room 300B, the rooms nearest to Room 33, are Phase 2 structures erected around AD 1040-1050. Room 33’s plank flooring was placed directly upon sand fill in an action unrelated to room construction or remodelling. Assuming that Judd is correct regarding the timespan of crafted board technology, Room 33’s floor planks were fabricated between c. AD 1040-1150.

This inference is somewhat weakened by the fact that this interval is estimated from tree-ring dating of structures in which planks were used as building materials rather than the boards themselves. This means that this technology could predate AD 1040. However, Room 33 plank dimensions indicate that fabrication occurred after woodworking knowledge had achieved an advanced stage. Average board width is close to twice that of other boards for which this data collected, even though thickness is the same or less than other boards. No measured board is longer than three feet. Comparative board length for Room 33 is difficult to assess since it seems that Pepper did not record this detail. Pepper's (1896a) field notes contain the only extant information, in which he notes that boards were "about the width of the room." This statement is ambiguous since it could mean that each board was about six feet long or that they reached room-width when placed end to end. Evenly honed planks having such dimensions (72"x12"x1") would be a remarkable technological achievement, though such expertise would be consistent with the Classic/Late Bonitian emphasis on architectural finesse.

Contra to Harrod (2012:125) the wood planks in Room 33 were not a "wooden platform," or at least not in line with those at Pueblo Bonito Ruin. As defined by Lekson (1999:89; Fig. 3.12) a Chacoan platform is a specific architectural feature comprising a series of room-wide, parallel beams, with diameters on the scale of primary or secondary logs, that are inserted (ie., built) into beam holes located at an elevation intermediate between floor and ceiling, at one or both ends of a room. Pepper (1920:186), who first coined the phrase, identifies such or similar features in several rooms, including the one in Room 38 where "the western support of the platform was upheld by posts." In marked contrast, from Pepper's description of the "up-turned" ends of the planks, it is quite evident that the planks essentially formed a "floating floor" supported only by natural accumulation of sandy fill, independent of walls or wood framing. It is also not an earthen platform in similar vein to those elevated, constructed features composed of cultural fill and debris found in various locations across the Pueblo Bonito (Stein et al., 2003:57).

Archaeological Evidence: Open "below-plank" environment

Plog and Heitman (2010:19623) support Pepper's (1909:221) contention that buriers deliberately covered Burials 13 and 14 with sand. Seemingly, since it has not been a point of discussion, the common archaeological viewpoint is that this effort included filling the entire floor space to an even level and laying of the plank floor shortly thereafter. As it stands, there is no means to establish Pepper's line of thought or to evaluate the fill evidence for the entire room retrospectively. Marden (2011:274-276; 2015) departs from these and other researchers in that she construes the area beneath the wood floor as an open microenvironment.

Pepper (1909) located significant clusters of turquoise pieces and other exotic items all four corners of Room 33, in addition to the rich deposits that accompanied Burials 13 and 14. He notes that the objects in the northeastern corner were "grouped about the post at various depths" (Ibid.:234). As this is Pepper's only statement regarding these items, it is unknown if the lowest deposits are indeed at the elevation of Burial 14, as Marden and other researchers infer. As part of her investigation, Marden (2011:373) evaluates Richard Bradley's (1995) view that mortuary rites are a process rather than a single event. She suggests that the immense wealth of items on the burials and clusters of objects found at different levels within some two feet of fill may indicate a series of object depositions rather than a single event. Marden (2011:276-279, 281) thus proposes that planks were lifted periodically, over months to decades, to gain access to the area below in order to deposit these items. She also submits that small items were dropped into the void via a four- inch hole at the eastern end of one plank (not specified by Pepper).

Although this is an interesting proposition, Marden also fails to present supporting arguments regarding her interpretation. She may envision a logical set of circumstances, but they are not evident. The conundrum is that the boards were supported by sand fill only, but this stratum cannot be present, in large measure, if the area below the floor is construed as an open space. What supported plank ends so that a void space remained open for months to decades? From Pepper's description, there are no wall ledges. Preservation of wood flutes (flageolets) and a woven mat means that it is improbable that a supporting wood framework decomposed entirely. In addition, Marden's posited post-mortuary object deposition locations (northeast corner, Burial 13 and Burial 14) are not in close proximity other than where the lower limbs of #13 overlap those of #14. In such case, how many void spaces would be necessary to accommodate dropped objects? Given that some two feet of sandy fill separated these individuals, who by Marden's (2011:279) account were buried in separate events, objects dropped in a void space at this nexus would be some two feet above #14 unless the idea is that the plank floor was in place from the time of his deposit. If so, what is, or would be hypothetically, the stratigraphic evidence to support this premise? In this regard, what is the assumption regarding plank length, which Pepper (1909) does not provide. Moreover, does Pepper's description of the material culture evidence provide support for the idea that items were clustered within an area directly below the hole in the plank? How would one approach identifying such a concentration especially if dropped in over time?

Speculative notions have a role in scholarly research since they can prompt future investigations. Both Bradley's (2008) Chaco Revival Hypothesis and Lekson's (1999) Chaco Meridian proposition are examples of such attempts to expand archaeological inquiry. However, as in those cases, such "exploratory thinking" must be made evident to separate it from premises involving inadequate methodology. If Marden offers this scenario as an interpretation, as it seems, then some supporting arguments would advance its credibility, especially since her thesis involves bioarchaeological methods. Pepper's records quality is certainly an impediment to evaluating these queries. Even so, some archaeological statements, suggestions for future research, or caveats at least, would lift Marden's interpretations to the same level as her persuasive arguments regarding the biological evidence.

Marden (2011:921) is a forensic anthropologist without formal training in archaeology, which undoubtedly accounts for some weakness in evaluating site formation processes. Rather, it seems that her interpretation of the planks is unduly influenced by the long-held notion, advocated by experienced archaeologists and bioarchaeologists, that the area below the planks is a special, subfloor space for high-status males. On the other hand, her notion of periodic depositions is entirely credible, as it takes into account variation in object depth, whatever the (unrecorded) vertical distance between these objects. The presence of Mesa Verde B/w mugs in the adjacent Room 28 (Judd, 1954: Plate 7) is also suggestive of commemorative actions. Moreover, Marden (2011:374) offers valuable alternative explanations for the below-planks “hoards of wealth,” such as corporate goods and manner of death, which are contra to the Akins and Schelberg (1984) postulation that these objects indicate personal status, i.e. hierarchical “paramounts.”

The concerns expressed here do not mean that Marden’s interpretation of the subfloor space should be rejected out of hand. There is definitely a need, to “push the envelope” in bioarchaeological and archaeological interpretations. The pertinent question is not what was supporting the floor so much as where are the supporting arguments? Absent the complications with the plank flooring, everything Marden proposes is credible and contributes significantly to the understanding of North Cluster skeletal and mortuary evidence. That there are limits to what evidence can be evaluated and also presented in a doctoral thesis is all too well understood. The seeming difference in interpretation regarding the presence of an underlying earthen floor is understandable, but the perspective here is that only weakness in Marden’s analysis is a lack of consideration of the planks themselves, and to a lesser extent, the movement of bones by burrowing animals. In this researcher’s opinion, archaeologists should have given planks attention many years hence so that Marden, and others, could build on that evidence. As it is, Marden’s scenario is unnecessarily complicated and impossible to sustain given the absence of stratigraphic detail from Pepper’s records. It seems rather that her attempt entails fashioning an explanation of material culture deposits and relocations of skeletised elements around the established view that the boards formed a subfloor space. Once board plank technology is taken into account, these convolutions are unnecessary since items can be added just by walking across the open floor space, as fill accumulated, up to the point the floor boards are laid.

Further re-interpretations

Technological attributes, in association with construction phase data, demonstrate that the Room 33 plank floor post-dates the calibrated radiocarbon dates of Burials

13 and 14 by at least 150 years. Such a result provides compelling evidence that the wood floor is not part of their built mortuary contexts. The upper range of the calibrated dates for “above floor” Burials 1, 3, 5, 9, 10 and 11 fall within the 12th century (Plog and Heitman, 2010: Tab. 1), which allows for the possibility that mortuary deposit occurred after the planks were fabricated c. AD 1040 or later. On the other hand, the dates for Burial 6 (cal. AD 776-989) and Burial 12 (cal. AD 676-894) pre-date c. AD 1040. This poses a problem in terms of superposition, since both individuals are located above the wood planks. This could signal that the floor was indeed fabricated at about the time of the depositions of Burials 13 and 14. Yet, re-appraisal of Pepper’s various descriptions provides a plausible explanation for this incompatible evidence.

Pepper did not create a profile map for Room 33, and his plan maps record locational information for crania only, apart from Burials 1 and 5. Neither Akins nor Marden offer profile or plan maps in their various publications, nor have any other archaeologists, with one exception. Plog and Heitman’s (2010: Fig 3) 3D profile map captures Pepper’s vertical and horizontal measurements for locations of crania, mandibles and selected objects. Pepper measured vertical distance between the bottom of a ceiling beam and the uppermost point of an object; horizontal location is determined by the distance between an object and an E-W or N-S wall. Plog and Heitman (ibid.,19622) advise that depth from ceiling beam may have an inconsistency error up to 15 cm since Pepper made use of different ceiling beams of unrecorded diameter; moreover, he seems not to have made adjustments for the “slight bulge” in the ceiling. However, the 3D map pinpoint locations do not take into account cranial dimensions, nor does it include the vertical position of the plank floor since Plog and Heitman are leery (for good reason) of the accuracy of Pepper’s single vertical measurement. Their 3D map utilises the metric system, which complicates correlation with Pepper’s statements. The conversion of Pepper’s feet/inches data to the metric system also seems to be the source of two errors in their publication. The first is that the east-west dimension (1.6 m/5’3”) in their Figure 3 map is inaccurate by some 20-30 cm. By Pepper’s measurements (1909:246; 1920:163) room width is either 1.83 m (6’0”) by north wall length or 1.91 m (6’3”) by south wall length. Fortunately, only a few horizontal measurements are inaccurate since Pepper took most measurements from the east wall. Plog and Heitman's (2010: 19622) description of fill unit depth between #s13 and 14 as "0.7 cm" is clearly a transcription error since their map accurately locates #13 at 0.7 m above #14.

In this chapter's Fig. 9x profile map diacritical marks indicate the points of measurement on each cranium as denoted in Pepper's sketch maps (1896a) or as described in text (1909). To approximate the distance from the measured uppermost point on the cranium to the underlying deposition surface, each individual is represented by a standard 6-inch "cranial depth," regardless of orientation. Arrows indicate the probable axial direction of the skeleton; line lengths for Burials 13 and 14 are approximately to scale. In the plan map, the outline of the room is based on Judd's more accurate drawing though slightly adjusted to accommodate wall length measurements. Post diameters, which were not recorded by Pepper, are an estimated six inches, though the "largest" one in the NW corner is eight inches. As noted on this map, the elevation of the plank floor location is uncertain. With these difficulties in mind, it is best to construe these profile and plan maps as plausibly realistic visual aids.

Plog and Heitman (2010: 19622) describe the floor as "laid across the entire room." However, while this is an understandable interpretation of Pepper's text, another possibility is that the planks covered just the central area of the room. Pepper does not specifically address floor-space coverage in the areas north and south of the support posts situated roughly 20-30 cm from each corner of the room. Potentially, boards were fabricated to accommodate these posts and the irregular spaces between them and the north and south walls. However, a reasonable inference is that skilled woodworking would have elicited further comments from Pepper.

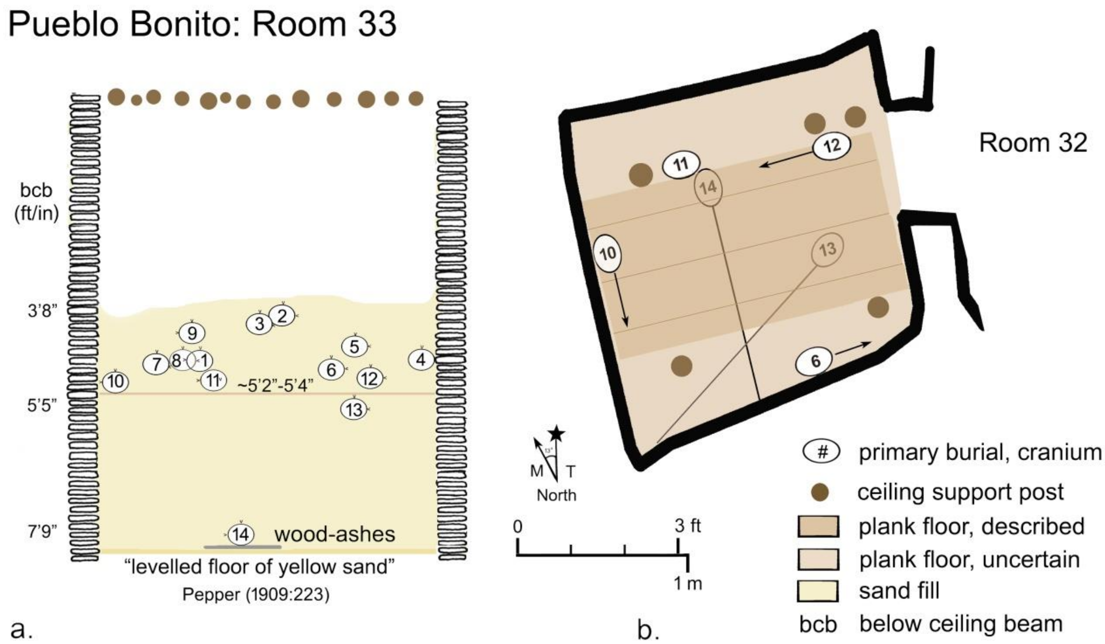


Figure F.1: Profile and plan views of Room 33, showing the locations of primary burial deposits and significant architectural elements.

Two statements in the 1909 monograph offer support for this alternative interpretation. Pepper (1909:221) writes "The boards curved upwards from the center, owing to the decaying of the bodies in the sand below them and to the pressure of the material above." Then in his conclusions (ibid.:248) he adds that the boards "were adjusted so as to cover completely the floor space presented by the sand placed over the first burials." Both statements specifically, and only, reference the floor-space associated with the burials. Although the lower limbs of Burials 13 and 14 extend beyond the southern posts, each cranium and the greater part of each skeleton is within the central region of Room 33. Potentially, Pepper's emphasis on cranial locations, to the near exclusion of other skeletal regions, could be a key aspect of the second description.

Therefore, if the plank flooring extends only as far as the posts, the potential for an irregularity in superposition is reduced significantly. In the Figure 9xa profile map, Burials 6, 10, 11 and 12 are on or just above the plank floor. By Pepper's measurements, Burial 11 is lower than the elevation of the plank floor, but the consistency error associated with variable distances from ceiling beam is probably in effect. By Pepper's account, #11 is above the boards. These four individuals are located on the Figure 9b plan map, as are Burials 13 and 14.

Assuming that the plank floor was fabricated c. AD 1040 or later, the radiocarbon dates for Burial 10 (cal. AD 1023-1185) and Burial 11 (AD 985-1181) are not problematic in terms of superposition, especially as both have median dates at about AD 1100 (Plog and Heitman, 2010:Fig 4). Burial 6/Fem A (cal. AD 776-989) predates the wood floor, but the location against the south wall places him beyond the accepted area of the plank flooring. Burial 12's radiocarbon result (cal. AD 676-894) is even earlier, but this individual is also along a margin of the described plank flooring. Interestingly, these are the only "above floor" individuals having bones reassociated from the "below floor" context. Marden (Marden, 2011:281) attributes this circumstance to mixing occurring when planks were lifted to gain access to the "subfloor" area. However, the more parsimonious explanation is that these elements were moved by burrowing animals whose movements were unimpeded by close-fitting planks in the areas north and south of the support posts. The proximity of the superior region of Burial 14 to this posited "clear" area could also account for the presence of several Burial 14 cervical vertebrae above the wood floor level.

Another point is that is uncertain whether the discovered location of Burial 12's cranium represents the deposition location. Pepper's (1909:220) description is sketchy, noting only that body "extended to the west, and many of the bones were in place." Yet, he also notes that the skeletons in the eastern part of the room were significantly disturbed (1909: 210). Other factors worth considering are that the enwrapped skeletons with some joints still connected by dried tissues some decades later (Marden, 2011:648) may have simply been moved aside to accommodate the laying of planks; alternatively, it would be a simple matter to slide planks under these remains. Considering the post-deposition disturbance and Pepper's vague descriptions, it is impossible to resolve. On the other hand, such nebulous evidence is insufficient to discount the credible evidence that the planks were fabricated years after Burial 6 and much later than Burials 12, 13 and 14. In this researcher's opinion, this explanation is more credible than Marden's interpretation that planks were lifted to access the "subfloor" area below the planks.

The symbol is the floor, not the hole in the floor

Heitman and Plog (2006: 90) advocate consideration of skeletal and artefact mortuary evidence in terms of "an integrated, multidimensional set of materials" (their emphasis) to recognize physical and cosmological connections. It is thus particularly puzzling that these experienced archaeologists do not give the plank floor equal attention to the posts in Room 33. As this evaluation demonstrates, a comprehensive assessment of all major material evidence is an imperative need in bioarchaeological research, especially when that evidence plays a significant role in interpretations.

The long-term focus on the Room 33 planks in terms of a "subfloor mortuary context" takes attention from possible metaphorical connections involving floors or deposition surfaces. In doing so, evidence that is more credibly meaningful, such as consideration of the ash layer that underlies Burial 14, is essentially unconsidered. Likewise, Pepper's comments about the colour of the underlying sand (fruitless as that may be) are unexplored in relation to descriptions of sand deposits in other Pueblo Bonito rooms. Perhaps most telling, the focus on the planks as a component of the mortuary contexts of Burials 13 and 14 has excluded consideration of their possible importance regarding the "above floor" burials. By standard archaeological convention, at least two individuals should be identified as "floor-associated," yet this consideration has never been part of the discussion.

Based on the mortuary evidence from the North and West Clusters, it is evident that deposit on a floor, or use surface, in an open environment was an important concept in the mortuary programs adopted for these two locations but not other great house proveniences at Pueblo Bonito or elsewhere in Chaco Canyon. Pepper (1909) and more recently, Plog and Heitman (2010) have considered possible symbolic or cosmological meanings for the four inch hole in the eastern end of one plank. Marden (2010) offers a credible argument in dispute of Pepper's idea that the hole references the *sipapu,* the place of origin, since no Chaco Canyon kiva has this floor feature. Pepper's description implies that this is a worked rather than a natural hole, it cannot be ruled out that this is the remnant of a knothole if the planks were made of pine, one of the likely wood materials. If so, the hole may have been there before the board was laid. One piece of information that may be pertinent to this discussion is that this Pepper does not mention this hole in his field notes or field journal. Rather, it is noted only in his 1909 monograph, published some 13 years hence. Though Pepper's, statement and discussion are quite pointed, but one wonders how much weight to give to this "evidence" considering that its occurrence cannot be substantiated by any documents now available.

Unless there was some practical need that is not now perceptible, the laying of crafted boards within, at least, the central floor space of the room may have held symbolic purpose. While Plog and Heitman (2010:19264) also draw attention to the possible symbolic meaning of the hole in the plank, they go further and suggest that the planks served as a metaphorical boundary between the underworld and upperworld. Since they draw upon Pueblo cosmology to make this case, their argument is sensible. While the thrust of their discussion entails discussion of the "below floor" mortuary evidence, the notion of the floor as a metaphorical concept is worth considering in other ways.

The notion advanced here is that the plank flooring references the concept of a floor as a specific mortuary locus of symbolic meaning, upon which, some distant ancestors/personage/ was deposited but is now overlain by sand. Also, could be a way to memorialise but segregate with idea of new beginning. In other words, the plank flooring is not really about the ones below, but rather, the ones above. Perhaps it has a cosmological meaning?

Plog and Hietman (2010:19624) evaluate possible cosmological meanings of the five posts in Room 33, in light of archaeological interpretations that such architecture is directly connected to such forces. They advance the idea that there is not a practical need to provide such substantial support to the overlying room. Instead, they state that the most western of the two poles in the NE corner did not reach the ceiling. However, this is incorrect. According to Pepper (1909:247), "this post extends from the ceiling into the room above." This means that the at least two floors were connected by the same pole—the earthen floor of the ground-storey and the constructed floor of the upper-storey. Depending on how one interprets Pepper's description, it either passed "through" or touched the plank flooring. Since the adjacent pole carried the weight of the overlying room, the western of these two poles would be redundant, and more so, would not have offered scant physical support to the floor above.

This discussion, extended as it may be, is important to interpreting Wallace Ruin. If the mortuary evidence for Burials 13 and 14 was consistent with a subfloor MCT, it would have no bearing on the interpretation of Wallace Ruin in terms of comparative frequency of floor and subfloor deposits since both are present at Wallace Ruin. However, since these two may have been founders, accompanied by extraordinary material wealth, their mortuary circumstances could have influenced memory and mortuary choices many years hence even at WR. Moreover, considerations of enduring metaphors or memories depends on accurate information regarding the mortuary contexts referenced.

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