Central Zagros Archaeological Project

Excavations at Bestansur, Sulaimaniyah Province, Kurdistan Regional Government, Republic of Iraq

26th March – 15th April 2016

Archive Report

Neolithic carnelian bead from Space 50, Building 5, Trench 10, Bestansur.

Preface

A sixth season of excavations at the site of Bestansur took place in spring 2016 as part of the Central Zagros Archaeological Project, co-directed by Roger Matthews, Kamal Rasheed Raheem and Wendy Matthews. The project operates under a Memorandum of Understanding issued by the Sulaimaniyah and Erbil Directorates of Antiquities and Heritage, with agreement from the State Board of Antiquities and Heritage, Baghdad, and from 2011-2015 was funded by a grant from the UK Arts and Humanities Research Council with the project title 'Sedentism and Resource Management in the Neolithic of the Central Zagros'. The spring 2016 season was funded by generous grants from the Gerald Averay Wainwright Fund of the University of Oxford and the British Institute for the Study of Iraq.

We are extremely grateful to all our colleagues at Sulaimaniyah Directorate of Antiquities and Heritage, in particular its Director Kamal Rasheed Raheem, who made the project possible and provided vital support at every stage, as well as all the support staff and drivers. We also thank our colleagues at Erbil Directorate of Antiquities and Heritage, in particular its Director, Abubakir O. Zainadin (Mala Awat), for their ongoing support. We are very appreciative also of the considerable assistance provided by the staff of Sulaimaniyah Museum, led by its Director, Hashim Hama. Our government representatives, Kamal Rouf Aziz and Sami Jamil Hama Rashid, gave support and advice in a great many ways as well as serving as a key team member. We also thank the villagers of Bestansur who worked with us on site and looked after us in the Expedition House. We give special thanks to Tobin Hartnell of the American University of Iraq, Sulaimaniyah, for his initial experiments with drone photography at Bestansur.

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The following report is a preliminary, provisional account of the results from the spring 2016 season, produced for distribution to the Sulaimaniyah, Erbil and Baghdad Directorates of Antiquities and Heritage, and is not intended for publication.

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Chapter One: Research Issues, Strategy, Methods

Roger Matthews, Wendy Matthews, Kamal Rasheed Raheem

Aims, objectives, issues

The aims and objectives of the overall project are:

1. To investigate issues in the transition from hunter-forager to villager-farmer in the Central Zagros region by the application of a full range of modern scientific and humanities-based approaches to Early Neolithic societies of the eastern Fertile Crescent.

2. To address the imbalance in our knowledge and understanding of the Neolithic transition in Southwest Asia through fieldwork and research in the eastern Fertile Crescent, and through widespread dissemination of results and interpretations within academe and beyond.

3. In collaboration with colleagues, to produce high-quality outputs that maximise the outreach and impact of the project's achievements.

The project research questions are:

1. Sedentism, society and ritual
Did early settlements develop from seasonal and temporary to year-round and permanent?
How were these early settlements constructed and socialised?
How significant was ritual in social transformations in the Zagros Neolithic?

2. Resource management
What were Early Neolithic economic practices and do they suggest a 'broad spectrum revolution'?
How best do we investigate hunting, management, and domestication of wild goat?

3. Chronology of change
What is the chronology of change in the Zagros Neolithic? How does high-resolution evidence develop our understanding of sedentism and resource management in Southwest Asia?

Methods

The main approach is ongoing excavations at the Neolithic sites of Bestansur and Shimshara, to investigate socio-economic and cultural strategies through the Early Neolithic. Recording and processing are managed through the web-based Integrated Archaeological Data-Base (IADB). Excavation is being conducted, employing trenches for diachronic investigation and open-area trenches to examine buildings, external areas, middens and streets/corridors. Excavated deposits are quantified, sieved, floated, sampled, and processed for recovery of lithics, ground-stone, clay tokens, figurines, faunal and botanical remains (macro and micro), phytoliths, molluscs, and architectural materials.

Additionally, intensive field survey was conducted during 2013 in the vicinity of Zarzi cave, in the Iraqi Central Zagros, in order to investigate the Neolithic settlement of this fertile region. Further seasons of intensive field survey are planned for the Zarzi region.

Chapter Two: Excavations in Trench 10

Roger Matthews, Wendy Matthews, Adam Stone and Tom Moore

Introduction

Excavations at Bestansur focused on Trench 10, where excavations have been undertaken in previous seasons (Fig. 2. 1). We expanded Trench 10 to an area of 18 x 14m, which enabled us to expose a significant area of Neolithic architecture on the lower eastern slopes of the mound (Fig. 2.2). In spring 2016 we investigated the archaeological deposits to the northwest of Building 5, in order to establish the full extent of Space 50 in particular.

Trench 10, Building 5

This season's excavations in Trench 10 were focused firstly on investigation and analysis of the human burials below the floors of Space 50 and the stratigraphic context of these, and secondly on defining the extent of the building in which they were placed, Building 5, dated to *c*. 7700 BC.

We established that there are an exceptional number of human remains interred within Space 50. The excavations this season increased the number of individuals identified from 28 to more than 52 individuals, with more remains detected but left preserved in the ground for the future seasons. This number of individuals is higher than that found in many houses from other Neolithic sites, which at Tell Halula in Syria, for example, is c. 5-15 within single buildings (Kuijt *et al*. 2011). The high number within Building 5 is larger than expected for a single household and suggests that there were extensive and long-lived relations between communities of individuals at Bestansur.

Four principal groups of human remains were investigated in the south and east of Space 50 (Chapter Five). All of these represent selective burial of particular skeletal parts, predominantly of skulls, long bones and ribs. Two of these groups were of mixed age groups, C1804 and C1810. C1804 included a spread of red-pigment between clusters of bones (Fig. 2.3) and C1810 included traces of white mineral material on many bones and a skull as well as red pigment (Fig. 2.4). A third group predominantly comprised juveniles and infants, C1812. The fourth group comprised scattered remains of human bone in the fill below the floors associated with scattered beads of shell (Chapter Six).

As the walls of Space 50 slope inwards, *c*. 10 cm of deposits have been left against the base and lower sections of the walls. These microstratigraphic sequences were carefully cleaned with an artist's palette knife, photographed and drawn at 1:5 and 1:10 to investigate the history of the construction and use of Building 5 and the complex burial sequence throughout the foundation, occupation and infill of the Building (Chapter Three).

We opened an extension of Trench 10 to the northwest of Space 50. After excavating upper levels with evidence of Iron Age occupation, including stone walls, we exposed the continuation of Building 5 Wall 52, forming the western boundary of Space 50 (Fig. 2.1). To the west of Wall 52 we also detected the continuation of a parallel wall, Wall 53, as well as a short return wall defining the northern limit of Space 63. The northern return of Wall 52 is not aligned with the previously detected series of walls (Walls 57, 58, 73), but it survives at a greater height than these lower walls and its alignment may be affected by slumping. Alternatively, the new wall may represent a later phase of the building, which may be investigated through future excavation.

Taken together with previous seasons' work, ongoing excavation of Building 5 is providing a detailed picture of Early Neolithic activity in and around a large building which had a special character associated with burial of the human dead.

Conclusions: a Neolithic 'House of the Dead'

The best parallels for Building 5 at Bestansur consist of so-called 'Houses of the Dead' from other Neolithic sites of Southwest Asia. The famous Skull Building at Çayönü appears to have been in use for up to 1000 years from *c*. 8500 BC, with at least 450 individuals represented by disarticulated remains (Özdoğan 1999). Further west, at the site of Abu Hureyra on the Syrian Euphrates, the Phase 8 building in Trench B, dating to *c*. 9000 BC, is a most informative parallel for Bestansur Building 5 (Moore and Molleson 2000). Room 3 of the Abu Hureyra building has the remains of at least 24 individuals laid on its successive floors through a lengthy period of time. The House of the Dead at Dj'ade al-Mughara, on the Syrian Euphrates and dated to *c*. 8000 BC (Coqueugniot 2000), also provides stimulating evidence with which to consider the Bestansur material. The Dj'ade House of the Dead consists of four small rectilinear rooms within which the remains of at least 38 individuals were found, mainly of infants and young adults.

We plan to complete the excavation of Building 5 and the underlying Building 8 in future seasons of fieldwork at Bestansur.

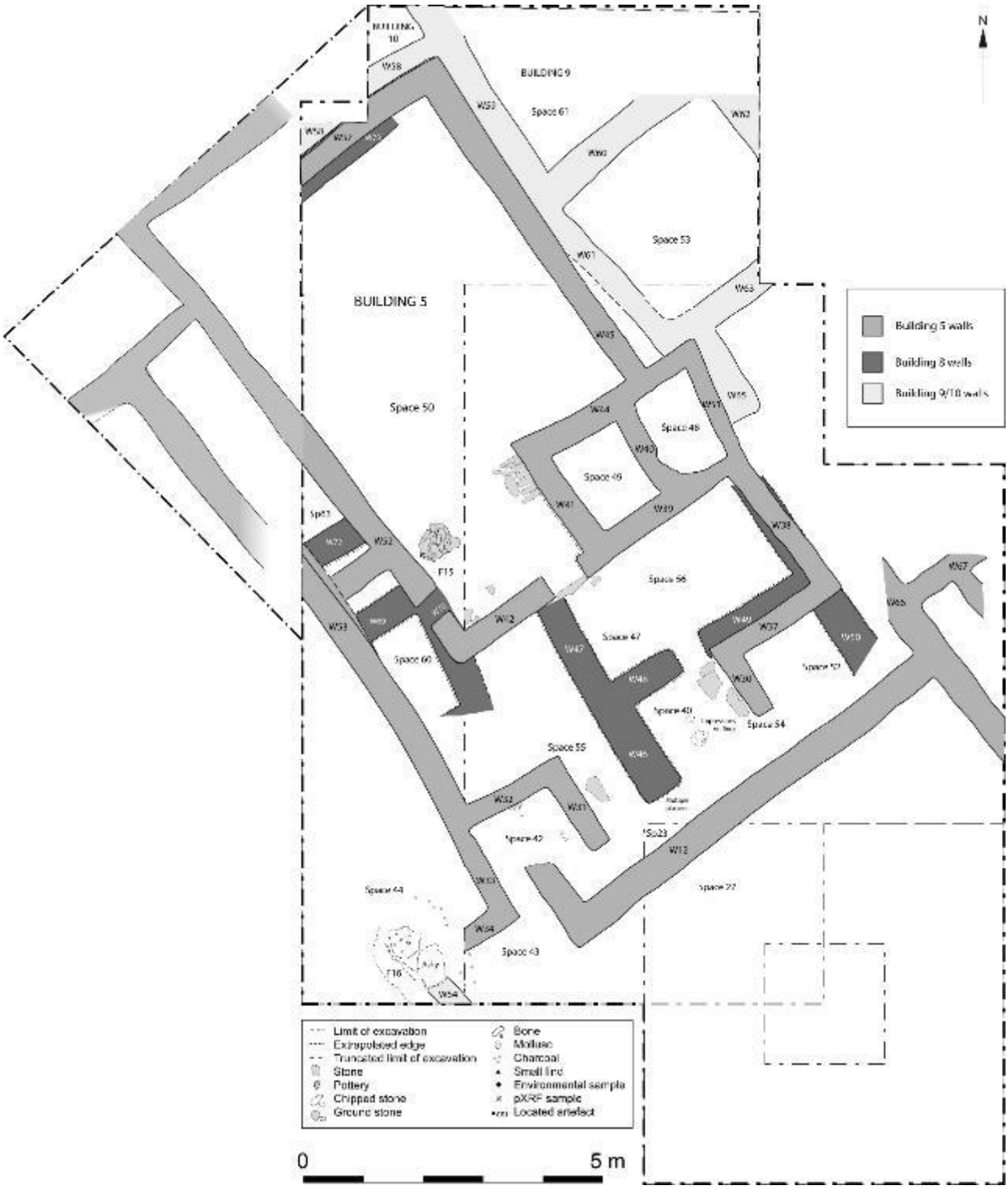

Figure 2.1. Composite plan of excavated walls, spaces, and features in Trench 10.

Figure 2.2. Drone image of Trench 10, Building 5. Image courtesy of Tobin Hartnell, American University of Iraq, Sulaimaniyah.

Figure 2.3. Red pigment on bones adjacent to two skulls, C1804.

Figure 2.4. Red pigment and white plaster adhering to bones, C1810.

Chapter Three: Architecture, Traces of Activities and Site Formation Processes

Wendy Matthews

Introduction

The focus of investigations and excavations in spring 2016 was in Trench 10 with the aim of completing excavation of Building 5 and the burials in Space 50, within it. Building 5 is elaborate and one of the largest in the eastern Fertile Crescent at *c.* 7660 BC. It is *c.* 12.5 x 7.75m, and 97m^2, with a wide flanking entrance way, entrance room, two side rooms and three other rooms, one of which, Space 50, is 7.7 x 4.7-5m, with >55 burials below and in some cases on the floors.

The aims in analysis of architecture, traces of activities and site formation processes in Building 5 this season were:

- to analyse the architecture by study of construction techniques and materials
- to study the history of place-making and activities in the large interior of Space 50, by analysis of the microstratigraphy of floors sequences that abutted the base of the walls
- to examine the history of human burials in Space 50 and the individuals and relations that they represent, by microstratigraphic investigation of traces of cuts through floor sequences in plan and in section (Fig. 3.1.).

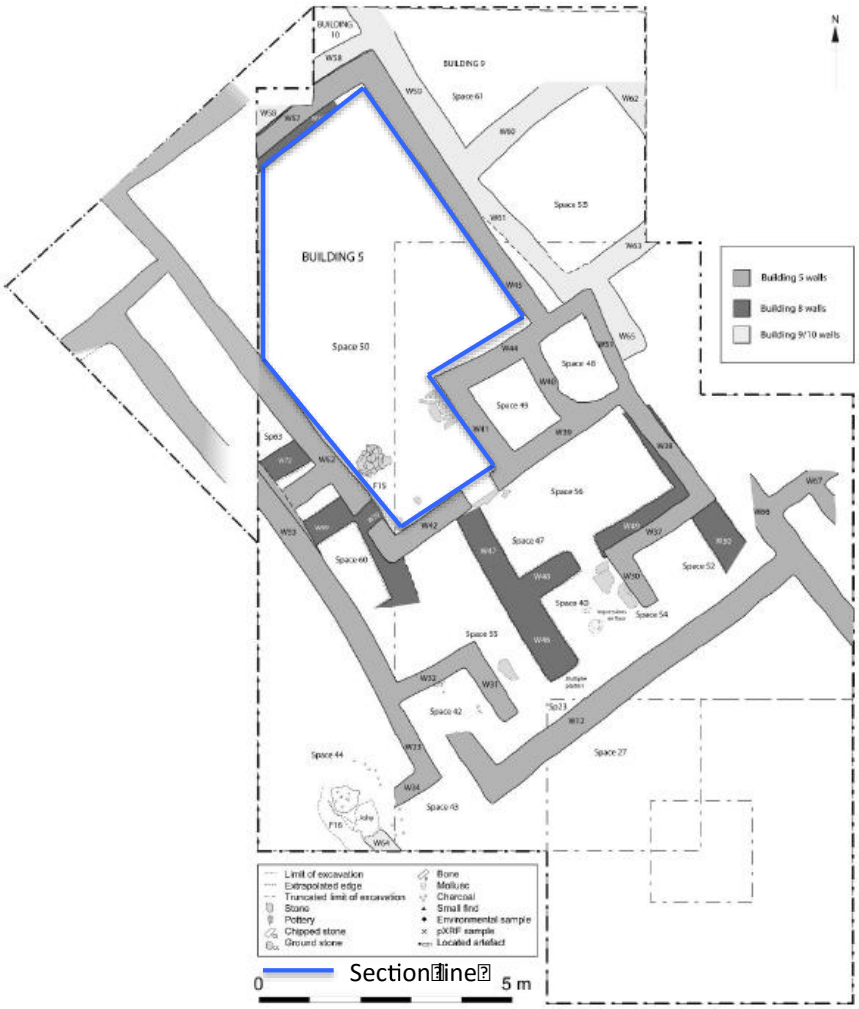

Figure 3.1. Building 5, Space 50, microstratigraphic sections recorded and sampled spring 2016.

Methodology

In order to reveal details of deposit composition, boundaries and cuts in the field, surfaces were carefully cleaned in plan and section using a trowel, artist's palette knife and photographic jet blower. As microstratigraphic features and details are most evident when deposits are moist, freshly exposed surfaces in section and plan were protected by plastic sheeting that was lifted back for investigation then replaced as soon as possible (Fig. 3.2). Where deposits had dried out, surfaces were sprayed with water and left for a few minutes, before being freshly cleaned and recorded as above.

Figure 3.2. Microstratigraphic section recording in deposits across northwest corner of Space 50. Scales = 50 cm. Looking west.

The inward slope of the walls in Space 50 (see Fig. 3.5) had been not completely excavated in spring 2014 to prevent wall collapse by undercutting. As a consequence traces of floor sequences abutting the base of walls and the basal room fill on floors had been left in vertical sections at the base of almost all of the wall faces in Space 50 (e.g. Figs 3.4, 3.7, 3.9). These remaining deposits provided a unique opportunity to study spatial and temporal variation in the activities and history of Space 50, from its foundation throughout its use, end-life and infill. To this end, all wall faces, floor sequences and traces of cuts in Space 50 were cleaned, photographed and drawn at 1:10 (Fig. 3.1). The section drawings and photographs provide a continuous record of more than 23.5m of *in-situ* walls, foundations, floors, cuts and burials, a threshold, collapsed walls and building infill, around the edges of the room and across the northwest corner.

To investigate particular sequences at higher resolution, block samples up to 15 x 8 x 8cm in size were cut out and wrapped tightly in tissues and tape and packed tightly in boxes for export for scientific micromorphological analysis in large resin-impregnated thin-sections. In spring 2016 four block samples were exported for micromorphological analysis from Space 50, Building 5, Trench 10 (Fig. 3.3, Table 3.1).

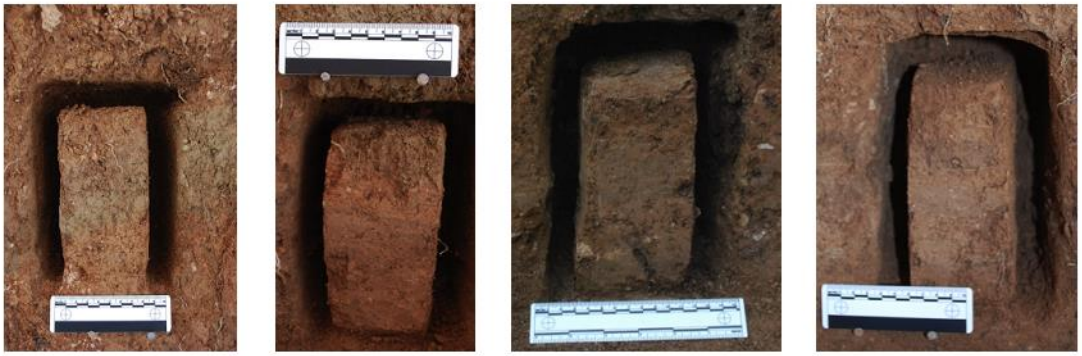

Figure 3.3. Block samples selected for micromorphological analysis (Table 3.1). Scales = 10 and 15cm.

Sample no.	Section no.	Material	Analysis
2413	122	Green ?roofing material and walls collapse	Micromorphology
2414	122	Foundation packing, floor surfaces with pigment and building infill	Micromorphology
2430	127	Foundation packing with gravel, multiple floors plasters and fill, and abutting wall plaster and mudbrick	Micromorphology
2415	122	Foundation packing, early and late floor sequences and building infill	Micromorphology

Table 3.1. Micromorphological block samples collected in spring 2016 for micromorphological analysis.

In addition, eight spot samples of sediment were exported for scientific analysis of the sources and composition of red, black and white pigment, and white plaster in the burials.

Architecture

The walls of the underlying Building 8 were constructed from a distinctive dark greyish brown silty clay and yellowish brown mortar, with yellowish brown plaster, as exposed in the south of the area investigated (Fig. 3.4).

Figure 3.4. Building 8 and 5 walls, and the thin skim of floors at the base of inward sloping wall faces. Looking southeast. Scale = 50cm.

Building 5 walls were constructed from reddish brown silty clay loam with white calcareous aggregates, which had been formed into sections of rammed earth as well as mud-bricks with dark greyish brown mortar and wall plaster (Fig. 3.5).

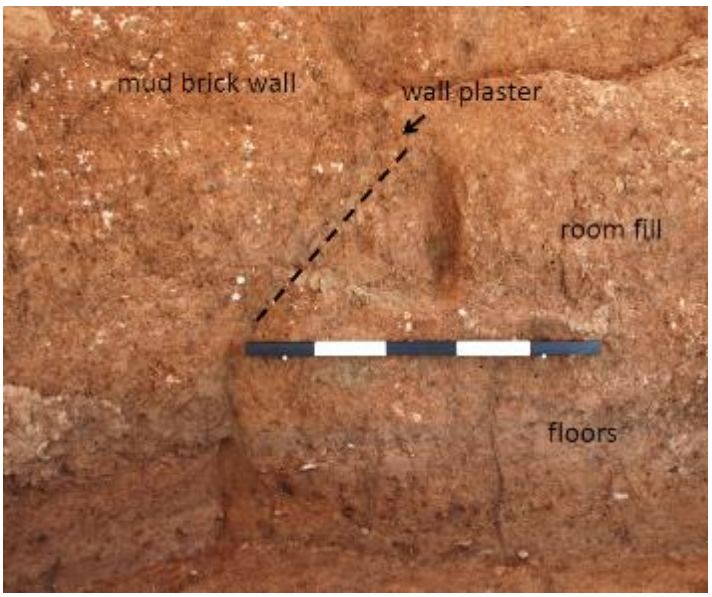

Figure 3.5. Inward sloping mudbrick wall and greyish brown plastered wall face, Wall 52, Space 50, Building 5. Looking west. Scale = 50cm.

The interior face of Space 50 was plastered with a 1-2cm thick greyish brown plaster, coated with a thin white wash, which is particularly well-preserved on segments of collapsed wall (Fig. 3.6).

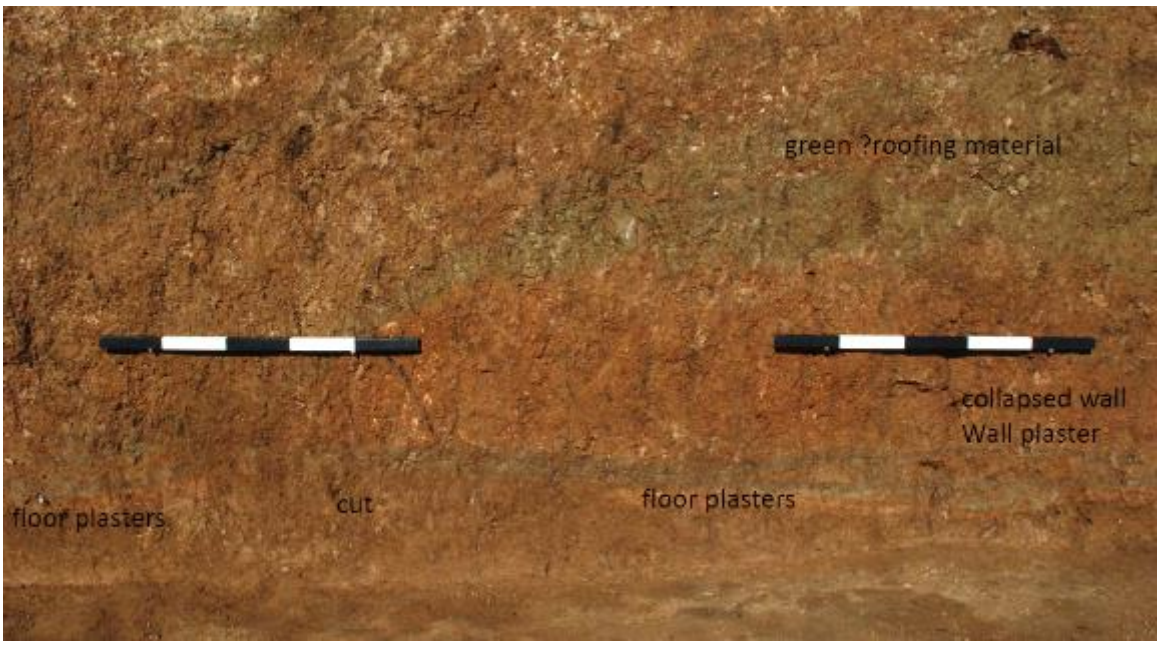

Figure 3.6. Section through northwestern corner of Building 5, Space 50: floors, cut, collapsed reddish brown wall with grey plaster with thin white wash still adhering to wall segment, and collapsed green ?roofing material. Looking west. Scale = 50cm.

The discontinuous thick sloping lenses of greenish silty clay in the room fill of Space 50 may represent collapsed roofing, as it is interbedded with wall collapse (Fig. 3.6). The composition and properties of these deposits are being analysed in block sample SA 2413. In the field, these greenish deposits had dense impressions and traces of partially mineralised brown plant remains. If these were roofing materials it is possible that the plant remains were added as temper a) to prevent cracking and shrink swell from alternate wetting and drying, as well as b) to lighten the weight of deposits on the roof.

Floor sequences

The thickest sequence of preserved plaster floors in Space 50 had been laid in the southeast corner, evident as an island 25-30cm in length of deposits, which been cut to the east and west (Fig. 3.7). This sequence, 4-5cm thick, comprises repeated applications of >*c*. 10 mud plasters of green, brown and lightly reddish sediments. The precise number, composition and source of these plasters is being analysed using a combination of micromorphology and high-resolution micro-analysis of block sample SA2430. It is possible that this thicker sequence and apparently higher number of plasters may correlate with the density of burials in this area of Space 50, as places may be prepared and renewed during and after acts of burial and commemoration, as documented in ethnographic research in India (Boivin 2000). This thicker sequence and high number and good preservation may also be due to greater protection of these extant floor surfaces in a corner location up against a wall face, away from areas of trampling and recutting for burials.

Figure 3.7. Island of well-preserved, repeatedly plastered floors in southeast corner of Space 50, truncated by cuts to the east and west. Looking southeast. Scale = 50cm.

A sequence of apparently early and later plaster floors (below collapsed wall and wall plaster- see also Fig. 3.6) was laid in the northwest of Space 50 (Fig. 3.8), and is being analysed by micromorphology and microanalysis of block sample SA2415.

Figure 3.8. Early and late floors in northwest corner of Space 50. Scale = 50cm.

Burial cuts and materials

Careful cleaning and close study of microstratigraphic sequences in the field in section and in plan, enabled further study of burial sequences and detection of cuts that had otherwise been difficult to detect during excavation as the floor sequences were often <1-2cm thick and were made from materials very similar to the underlying foundation packing and infill of the cuts.

It was evident from meticulous excavation, and study of deposits close to wall faces, that some skulls are foundation burials, or earlier than Building 5, sealed by packing and the gravel lining close to the wall face, and thick overlying green and reddish brown plaster floors, such as those by the eastern wall, Wall 45 (Fig. 3.9).

Figure 3.9. Burial sealed by fill/packing and gravel foundation and plaster floors of Building 5. Looking northeast. Scale = 15 cm.

Other burials were cut into floors and foundation packing and underlying walls of Building 8, such as that in the centre of Space 50, C1825 (Fig. 3.10).

In the area of the thick sequences of floors in the northwest corner, the floors to the east and west had been cut, probably by burials in this area. The cut to the east was the earliest of these, as it was infilled and covered by at least two reddish brown and green plasters. The cut to the west was late in the history of this space, as there is little evidence of overlying plaster floors.

In section, a range of other cuts were detected that had been subsequently plastered over, such as that in Fig. 3.6. Some cuts may have been for retrieval of skulls or bones and may have been subsequently infilled.

Figure 3.10. Underlying mudbrick wall of Building 8 (left), cut by burial exposed in C1825 (right). Scale = 10 cm. Looking north.

The traces of materials in burials included an irregular patch of red pigment in C1804 (Fig. 2.3). The undulating contours of this suggest that it may have been used to pigment organic materials such as a bag or basket that has since decayed. This material was carefully lifted and small spot samples exported to study the pigment type and source and to analyse traces of organic materials. Some traces of black and white material adhered to some bones which were also sampled for materials analysis, to inform future excavation and conservation.

End-life and collapse of the building

Space 50 walls leaned slightly in towards the room, suggesting that the walls may have been pushed in at the end-life of this building, as evident for Wall 52 (Fig. 3.5). Some sections of wall plaster still adhered to the walls of Building 5, while others had collapsed with walls in large sections >1.5m in length, further suggesting rapid infill, rather than longer term erosion. The sloping interbedded distribution of the possible green roofing material in Building 5 collapse (Fig. 3.6), is similar to that observed in sequences of collapse in traditional mudbrick villages and will be compared to these in further study. The micromorphological samples SA 2413 and 2415 are being analysed to investigate these materials, site formation processes and the end-life of the building.

Future research and recommendations

Building 5 and the underlying painted Building 8 are both of major importance in the study of early architecture, sedentism and burial practices and social networks and interactions in the Early Neolithic, given their size, contents and elaboration at and prior to *c.* 7660 cal BC. Building 5 at *c*. 97m^2, is larger than the earlier buildings at Nemrik, which are *c*. 56m^2, at *c*. 8270 cal BC (Kozlowski 1990), and the later buildings at Jarmo *c*. 6500 BC, which are difficult to distinguish as separate buildings, but may have been in the order of 36-40m^2 (Braidwood *et al.* 1983). The interior of Space 50, at 7.5 x 5m, is also much larger than those constructed at Jarmo, at 3.2 x 2.6m, capable of hosting public (near phase) scale rather than just social scale interactions (Fisher 2009, Table 1).

Building 5 is also larger than contemporary buildings at Tell Halula, Syria, *c*. 7750-6780 BC, which were 46-82m^2 (Molist 2013). In addition, Building 5 was host to many more human burials, at >55, than those at Tell Halula, which housed 5-15 individuals. Building 5 was clearly an important place in which to create and mark social bonds and connections, which the artefactual evidence in particular attests, may have extended well beyond the settlement and its prime place on a crossroads by a major spring and water-course on a fertile plain.

To enable further unlocking of the remarkably complex sequences of burial practices and the life-histories of these important buildings and the transitions between them as excavations proceed, it is recommended that a similar practice of careful cleaning and close analysis and recording of microstratigraphic sequences and flexible use of sections be applied in excavation of the remaining burials and deposits in Space 50, together with 3D recording and photography, and a continued programme of interdisciplinary archaeological science at the site. Reconstruction of a replica of Building 5 adjacent to the site would enable the impact of this building and settlement to be appreciated by much wider audiences, especially when combined with augmented reality applications, to illustrate the richness of the culture and communities associated with it.

Chapter Four: Microarchaeology

Ingrid Iversen

Introduction: research aims and objectives

The purpose of flotation of excavated sediment and the processing of the resulting heavy residue during the season reflected the main objective of the excavation; namely to investigate the human burials and associated material. The aim was to maximise the recovery of all artefacts which is enhanced by the systematic processing of all sediment. This is in contrast to previous seasons when the primary objective was the examination of spatial patterns of microartefacts and the interpretation of the results in understanding the spatial organisation of activities. For a discussion of the approach adopted in previous seasons see the archive reports (Iversen 2013a; 2013b). The method for the sorting and recording of heavy residue remains as before as does the measurement and reporting of the results for the density of material (Iversen 2014: 27).

Spring 2016 activity

Flotation

The 19 new samples which were processed during the season totalled 460 litres of sediment (see Table 4.1). The majority of the samples (16 totalling 373 litres) were collected from burial contexts in Space 50 and represented all the excavated sediment; the remaining three (totalling 63 litres) came from the westward extension of Trench 10. The samples were collected in 9 different contexts and the average sample size was 23 litres, ranging from 57 litres to 1.5 litres. Three samples totalling 73 litres which had not been processed in spring 2014, because of a lack of time, were floated during spring 2016 and there is now no remaining backlog.

FLOTATION		
Number of samples		22
From Neolithic contexts		20
Volume (litres)		533
Average sample size (litres)		23
Number of contexts		9
HEAVY RESIDUE SORTING		
Number of samples		32
Volume (litres)		617
Average sample size (litres)		19
% sorted	**4mm**	100
	2mm	57

Table 4.1. Summary of activity: flotation and heavy residue.

Heavy residue sorting

All samples were sorted by size and then by material (32 samples including the backlog from previous seasons). The 4mm fraction was sorted in its entirety for all samples but with the smaller size fraction (2mm) a proportion was left unsorted in some cases, typically 50%. The results from the sorting of the smallest size fraction (1-2mm) in previous seasons suggest that little is gained from sorting this size of residue and as it takes longer than the larger size fractions it was left unsorted (Iversen 2013a).

The 13 samples, totalling 182 litres, which had been left unsorted or unrecorded in the previous season, were processed and there is no remaining backlog.

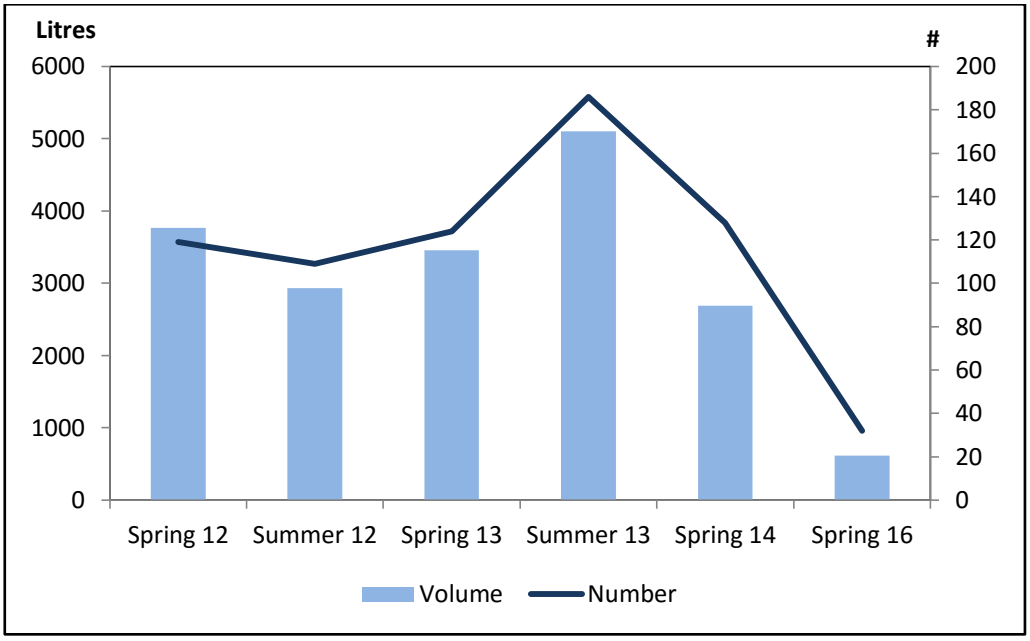

Figure 4.1. Heavy residue sorting: volume and number of samples by season.

The main objective in the collection of samples for flotation and the sorting of heavy residue during the season was to ensure the recovery of artefacts associated with burials. To achieve this aim, the proportion of the 2mm size fraction which was not fully sorted was carefully scanned for beads and other artefacts. A few beads were recovered this way and we are confident that overall the recovery of beads is close to 100% in floated samples.

Two samples of around 2 litres each were not sorted in the usual way, but scanned for microartefacts before being passed on to the human bone specialist being comprised almost entirely of human bone.

Results

In Space 50, the horizontal grid which had been established in the previous season of excavation was maintained and the samples processed from this space can be connected to a specific square within this grid (see Fig. 4.2). All the sediment collected in the excavation of this space was floated allowing an accurate calculation of the density of all artefacts including those handpicked before flotation.

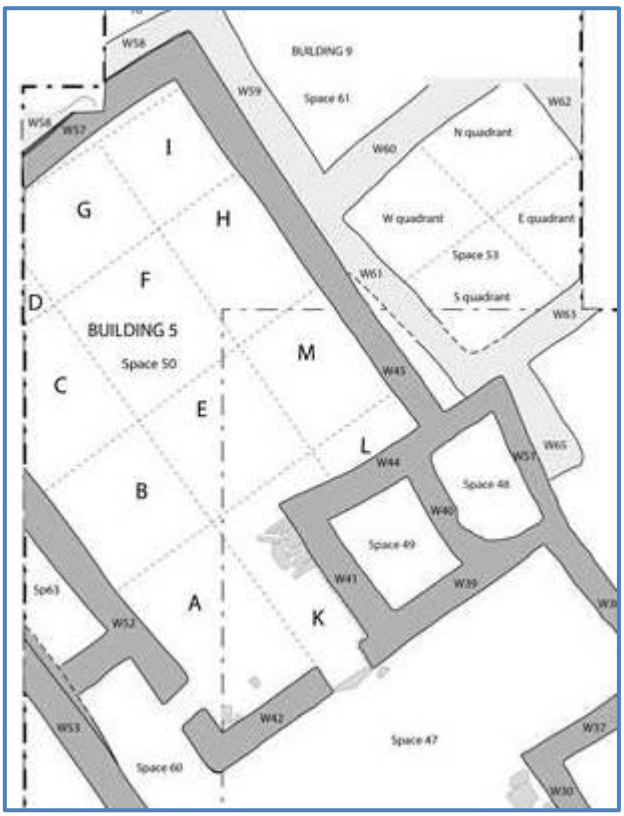

Figure 4.2. Space 50 with sampling grid marked.

The number of samples and volume of sediment processed from each square varied with over half the total volume collected in K and E where the sample size was an average of 32 litres compared with an average sample size of 16 litres for the other squares (see Fig. 4.3). This reflects the excavation with a number of the smaller samples collected from immediately around clusters of bones in some squares, especially in H. This is in contrast to the larger samples collected over a wider area such as in E. The results have been organised spatially, moving northwards in Space 50 (see Fig. 4.2).

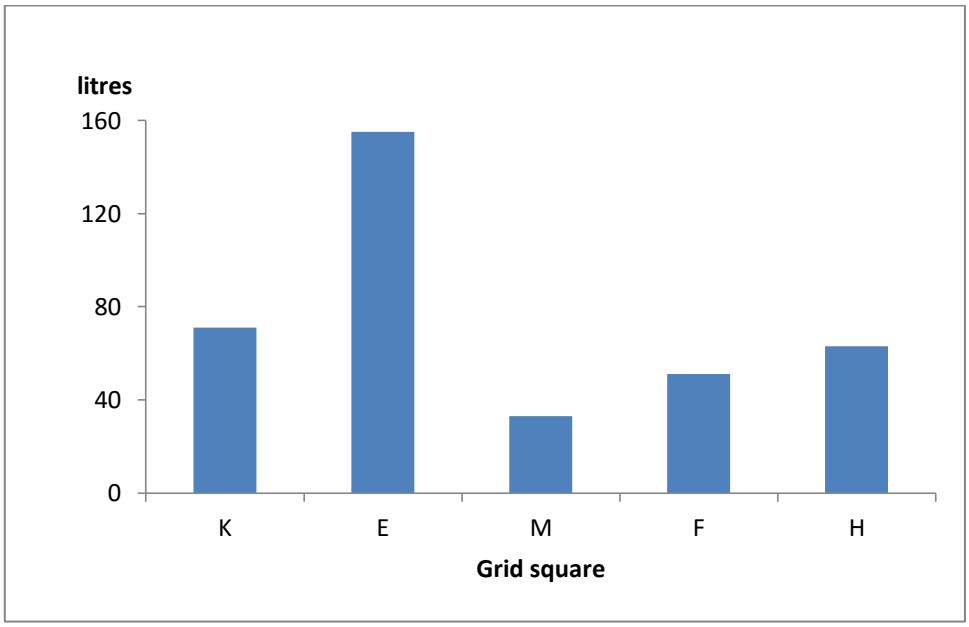

Figure 4.3. Volume of sediment processed by grid square.

Density of microartefacts

Mollusc and chipped stone

The density of all material is low with small amounts of mollusc microdebris at 0.3g per litre (compared with an average of 0.4g per litre for all internal spaces), while the density of chipped stone microartefacts was 0.4g per litre which is in line with the results from other internal spaces. There is some variation across the space as can be seen in Fig. 4.4, but the differences in excavation and sampling, discussed above, caution against drawing any conclusions from these results. The key finding is that the artefacts represent background noise rather than evidence of specific activities. The absence of animal bone supports this view.

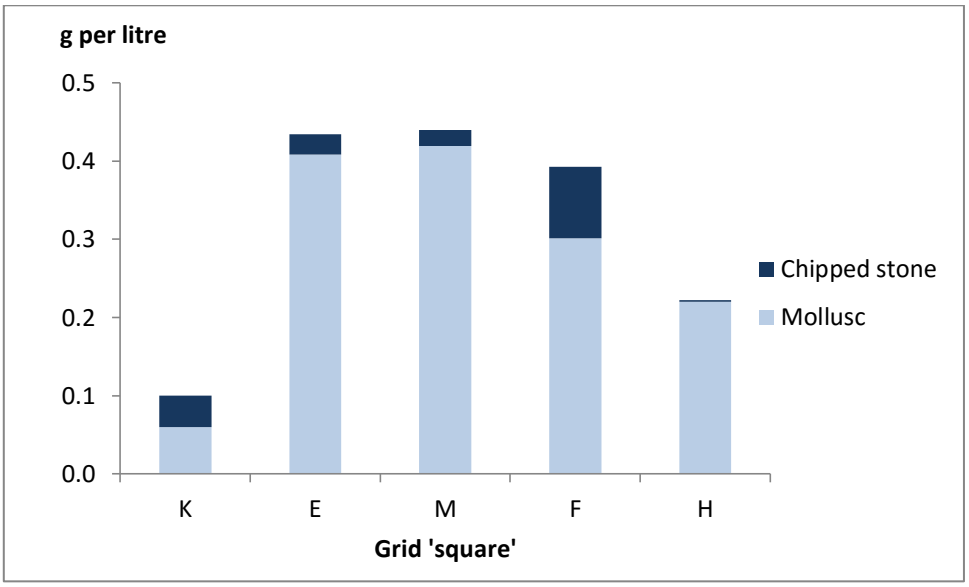

Figure 4.4. Density of microartefacts shown by grid square.

Human bone

The density of human bone in samples was on average 2g per litre, when the samples taken from immediately around bone clusters were excluded. The density was similar across all samples. The samples collected from around the clusters of bones obviously had a much higher density of human bone with very small amounts of other material. They were collected to ensure that all the human bone was collected as well as to check for other artefacts, such as beads and were on average small volume samples (less than 10 litres).

Beads

Beads were recovered both through handpicking during the excavation and from the sorted heavy residue. The two methods of recovery can be combined and the density of beads relative to excavated sediment measured. Beads were recovered from the two adjoining squares K and E, with the greater number and density found in E, with an average of 5 beads per 10 litres (73 beads in total) compared with 3 per 10 litres (20 beads in total) in K. Square E accounted for 29 of the 30 dentalium beads recovered.

While the beads are associated with human burials, the other areas with human bones did not produce any mollusc or dentalium beads. Again this may well reflect the smaller area sampled and the focus on excavating the human remains within those squares.

Summary and conclusions

The relatively short season and the nature of the deposits being excavated is reflected in the small number of samples collected and processed. The objective of the full recovery of artefacts, primarily beads, was enhanced by floating and sorting all excavated sediment and the results for other material confirmed that these spaces with human remains show little evidence for activities.

Chapter Five: Human Remains

Sam Walsh

Introduction

Previous field seasons at Bestansur led to the discovery of numerous human burials, primarily in Building 5, Space 50, Trench 10. The field season of spring 2016 was planned with the intention of excavating the remaining burials in Space 50. It soon became apparent that the burials found towards the end of the 2014 season were a small portion of a much larger scale skeletal deposit within this space.

The aims of the field season were to complete analysis of the human remains excavated in previous seasons and to continue the excavation of human remains in Space 50. The overall objective was to gain an understanding of the burials in terms of: Minimum Number of Individuals (MNI), sex, age-at-death, health and trauma, taphonomy, and burial practices.

Sampling for exports in order to conduct scientific tests was decided early in the season. In addition to expanding our previous samples for radiocarbon dating and isotopic analysis, it was decided to sample for aDNA (see methods).

Methods

The human remains were excavated following the standards of Brickley and McKinley (2004) and Baker *et al*. (2005). Human remains at Bestansur have been found in various states of articulation and disarticulation. The various types of bone deposits are approached differently depending on if they are articulated, disarticulated, scattered, or clustered. For example, small bone fragment scatters are numbered and plotted in order to map bone elements that may relate to specific deposits or events. Some deposits are disarticulated 'bundles' of human remains; these are excavated and recorded in layers when possible.

For osteological analysis, the features examined to estimate age-at-death included, where possible: the pubic symphysis, auricular surface, cranial sutures, and dental attrition and wear (Lovejoy 1985; Brothwell 1989; Brooks and Suchey 1990; Buckberry and Chamberlain 2002). Age-at-death of juveniles was assessed by examination of morphological development and metrical analysis of the bones, and dental development and eruption (Schaefer *et al*. 2009; Scheuer and Black, 2000a; 2000b). Sex was assessed primarily using cranial features and pelvic bones, along with general morphology, robusticity and size (Buikstra and Ubelaker 1994).

Evidence of palaeopathology was recorded by location, description, photography, and X-radiography where export is possible. Differential diagnoses were carried out following Aufderheide and Rodríguez-Martin (1998), Ortner (2003) and Waldron (2009).

Taphonomic alterations were assessed to analyse pre and post-depositional modifications to the bones, these included: weathering (Behrensmeyer 1978), carnivore activity (Haglund 1997), fracture patterns (Villa and Mahieu 1991, Knüsel 2005).

Single contexts and individuals were sampled for radiocarbon and isotopic analysis using standard methods following Brickley and McKinley (2004) and Mays *et al*. (2013). Sampling of individuals for aDNA followed Pinhasi *et al*. (2015). Dental sampling for aDNA analysis of dental calculus followed Fuente *et al*. (2013) and Weyrich *et al*. (2014).

Spring 2016: contexts and preliminary results

The focus of excavation and analysis were the human remains in Space 50. Excavation began with identifying priority areas where human remains had been visible at the level reached during the previous season. After the 2014 season the intention was to complete the presumed last burial deposits (C1784, C1788 and C1789) and layer C1775/C1781, which contained scattered small bones and teeth.

Context 1803

Context 1803 was excavated within the grid system and resulted in the recovery of further scattered teeth and small bone fragments. Clusters of bones were visible in grid squares E and M and contained commingled juvenile remains and other elements. Additionally, an area against wall 45 in grid H also had an area of scattered bones. It soon became clear when excavating squares E and M that there were numerous juvenile skulls, which were continuing within the deposit; similarly deposited adult remains were revealed in square H. Due to the amount of co-mingled remains the focus of the excavation became grid squares M, H, and E. None of the grid squares investigated was excavated fully at this time due to the unexpected number of remains and the fragile condition of the bones.

Context 1812 (square E)

After the excavation of an infant burial (C1783) during 2014, a further infant burial was slightly visible. Upon excavation of this infant burial, other infant and young child remains were revealed. These were again highly comingled, compacted and fragmented. The area excavated measured 2m by 1m, to a depth of 0.20m (Fig. 5.1).

There were 14 groups of bones with an MNI of 12 individuals, of these one is an older child aged around 5 to 7 years. The other 11 are infants aged between birth and 2 years. Sk1 had an adult hand bone on the skull, similar to C1731 in the previous season. Sk9 was the most well preserved skull with associated vertebrae and ribs and is likely associated with limb bones designated Sk14. The other individuals were predominantly represented by skulls in various states of completion, and fragmentation. The smallest of these were especially fragile.

Multiple individuals from this context had pathological alterations. Infant long bones and cranial fragments displayed periostitic bone, and porosity and resorbtion of the cortex. Skull fragments from Sk3 and Sk5 had porosity, striae and resorbtion of the cortex potentially indicating porotic hyperostosis.

Figure 5.1. Sk8-Sk12, C1812.

Context 1810 (square H)

This area adjacent to wall 45 was initially excavated in order to remove a few scattered bones, which appeared to be continuing under the wall. Excavation revealed an adult skull and numerous other long bones and partially visible fragments which were highly compacted and co-mingled. As different bones were revealed it became clear that some were also partially coated in a plaster-like substance, with some areas of red ochre coating bones, or surrounding them (Fig. 5.2). The sample area excavated measured 1.35m by 1.55m, with a depth of 0.10m.

This deposit did not have any delineation between individuals but has an MNI of 3 individuals. These are one adult, one adolescent, and one infant. Teeth from the adult skull give an age of around 30 to 45. Adult vertebrae from this context displayed articular surface porosity and slight osteophytosis.

A number of bones from this deposit had significant taphonomic alterations including, a tibia with red staining and a humerus with associated possible plaster. A distal ulna also had a very clean break and a peri-mortem fracture indicative of human activity. All these alterations indicate significant post-mortem manipulation of the remains. A further skull was visible but not excavated at this time so has not been included in the current MNI.

Figure 5.2. Human remains in C1810.

Context 1804 (square M)

A circle of crushed skull was first visible and excavation revealed a partial fragmented juvenile cranium over a juvenile skeleton laid on the right side in a flexed position, with another skull next to the pelvis. More juvenile skulls and other co-mingled elements were then revealed within this area (Fig. 5.3).The sample area excavated measured 0.50m by 0.50m in size, with a depth of 0.20m.

This deposit has an MNI of 4 individuals (a further 4 were not excavated at this time). These were all juvenile individuals, one aged at 2-4, one at 4-5 and two others of infant age. Some of the bones had concretions (as seen on previous seasons' juvenile remains), one skull (Sk6) was heavily stained with red ochre and black staining. Skulls Sk2 and Sk4 also had black staining.

Figure 5.3. Human remains in Context 1804.

All the remains excavated so far indicate that this layer of co-mingled compact, disarticulated remains may continue within the entirety of this large room. In summary, the remains excavated from Space 50 during spring 2016 have a preliminary MNI of 19, the majority of which are juveniles. A further seven unexcavated individuals and/or deposits have been identified for future excavation, including a skull in square B, and two skulls in square F (these are not included in the current MNI).

Osteological analysis of burials from previous seasons

Excavation of the following contexts was discussed in the 2014 archive report. In this section we report on preliminary analysis of human remains from these contexts.

Context 1775

Context 1775 is a scatter of small skeletal elements on a floor surface. There were 22 teeth from this scatter, with an MNI of 4 individuals; one infant, one adolescent, one young adult, and one older adult. Fragments included numerous fragments from the skull, hand, foot, and thorax, with a smaller number of epiphyseal limb fragments (Fig. 5.4; Table 5.1). These represent two individuals, one adult, and one infant. At least one individual within C1775 had pathological bone alterations. Firstly some hand and foot bones had fusion, porosity, periostitic bone formation, and lysis. There was also porosity and periostitic bone on bones of the ribs and vertebrae and on skull fragments. These lesions may indicate some form of infection or malnutrition (Waldron 2009).

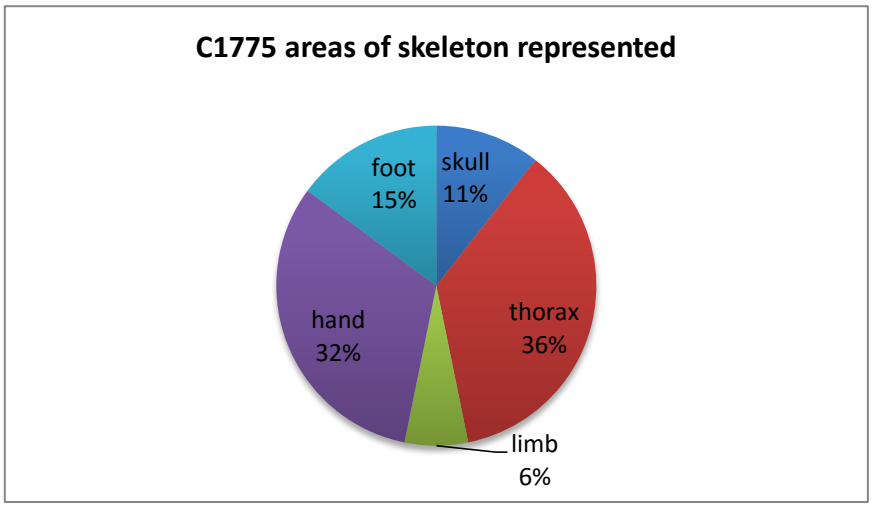

Figure 5.4. Percentages of areas of skeleton represented in C1775.

Area	Fragments
Skull	5
Thorax	17
Limb	3
Hand	15
Foot	7

Table 5.1. Number of fragments from each area of the skeleton in C1775.

Context 1781

Context 1781 is a similar deposit to C1775 but is part of a packing layer beneath the floor. There were 27 teeth from this layer; these have an MNI of three individuals, one infant, one young adult, and one older adult. Individually recorded fragments are predominantly of the hand and foot with some epiphyseal limb fragments, which are from multiple age groups (Fig. 5.5; Table 5.2.).

The lowest represented elements for both these contexts are the skull and limbs, which is to be expected from remains left behind after defleshing and removal of the larger bones as part of a secondary burial process.

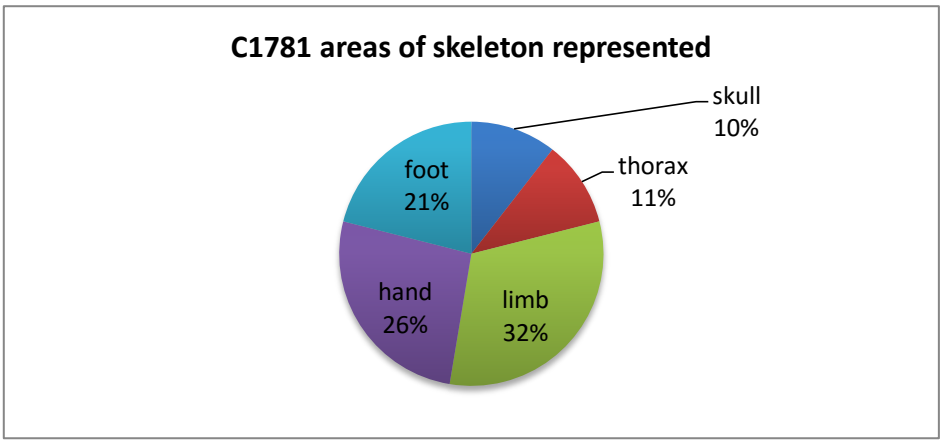

Figure 5.5. Percentages of areas of skeleton represented in C1781.

Area	Fragments
Skull	2
Thorax	2
Limb	6
Hand	5
Foot	4

Table 5.2. Number of fragments from each area of the skeleton in C1781.

Context 1754/1774

Context 1754/1774 was a spread of adult bones and represents one individual, predominantly made up of ribs and vertebrae (Fig. 5.6; Table 5.3). There were also two mostly intact long bones, one skull fragment, and one complete pelvic bone. The latter indicates a possible female. Unlike C1775 and C1781, this deposit contained larger and more complete elements of the limb and pelvis. The way the bones were spread out and the partial fragmentation to the limb bones suggests that this may have been a single individual, part way through the defleshing and removal of some of the larger bones.

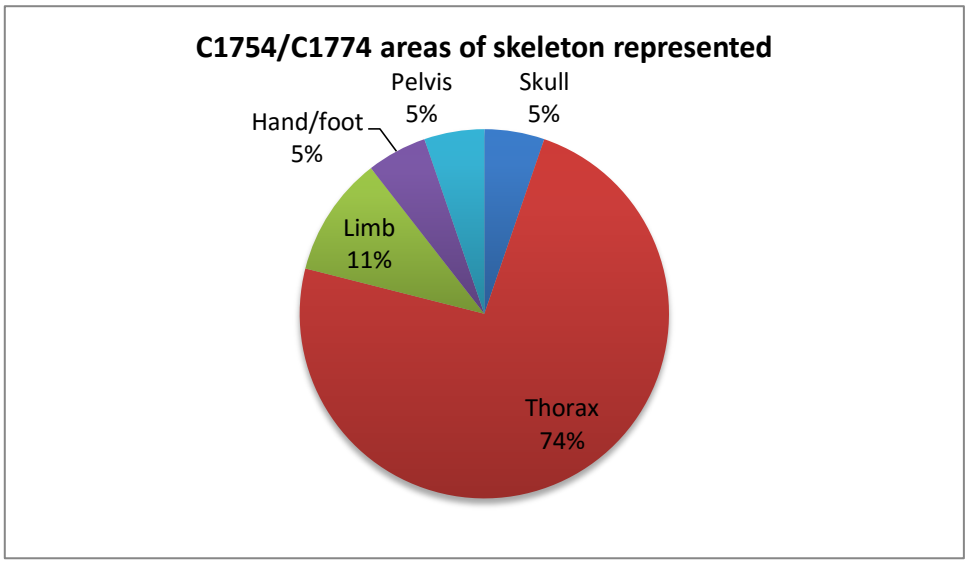

Figure 5.6. Percentage of areas of skeleton represented in C1754/C1774.

Area	Fragments
Skull	1
Thorax	14
Limb	2
Hand/foot	1
Pelvis	1

Table 5.3. Number of fragments from each area of the skeleton in C1754/1774.

Context 1784

Context 1784 is a deposit comprising a skull, numerous long bones, pelvic bones, ribs, and vertebrae. This deposit may represent more than one individual but the extent of the deposit is not yet fully understood or excavated. The current analysis indicates one young adult female aged 16-25 from the dental wear and long bone fusion. This deposit is potentially one or more individuals who were still partly articulated at deposition, with some arrangement of disarticulated areas (see spring 2014 archive report for detailed description). Some small bones from this deposit had calcretions similar to those seen only on juvenile remains from previous seasons' excavations (Fig. 5.7).

Figure 5.7. Distal adult phalanx with calcretions from C1784.

Context 1788

Context 1788 is represented by a skull, and the majority of information comes from the dentition which is complete. The overall morphology of the skull indicates that this is probably a female. Analysis of the dental wear gives an age of around 20-30 years, however the upper third left molar was unerupted and some of the molars have greater wear likely caused by use of these teeth for activity of an unidentified nature.

The occipital, frontal, and parietal bones have porosity and pitting mostly on the external surfaces with some resorbtion of the internal surface (Fig. 5.8) which could indicate anaemia or other form of malnutrition (Ortner 2003, 369; Waldron 2009, 136).

Figure 5.8. Supra orbital area (left) and cranial lesions (right) from C1788.

Context 1789

Context 1789, another skull, also represents one individual which is less complete than C1788. Of the dentition, there are only 12 teeth including one molar from the left side, and the remaining 11 teeth from the right. It is possible that the missing teeth are still to be excavated. Dental wear gives an age of around 30 to 40. The lower right first molar has more severe wear possibly relating to activity or potentially uneven wear from loss of other teeth (although the other wear is very even). From the morphology and robusticity of the mandible and orbital bones this is a male individual. The parietals have thickening of the external cortex and extensive arachnoid granulations, and the orbits have porosity indicative of cribra orbitalia (Goodman and Armelagos 1989).

Discussion

Overall, the minimum number of individuals excavated during spring 2016 was 19, of which only one was an adult and the rest were juveniles, the majority of whom were infants (Table 5.4; Fig. 5.9).

Age group	**MNI**
Infant	14
YC	2
OC	1
Adolescent	1
Adult	1
Total	19

Table 5.4. Minimum number of individuals excavated during the 2016 season.

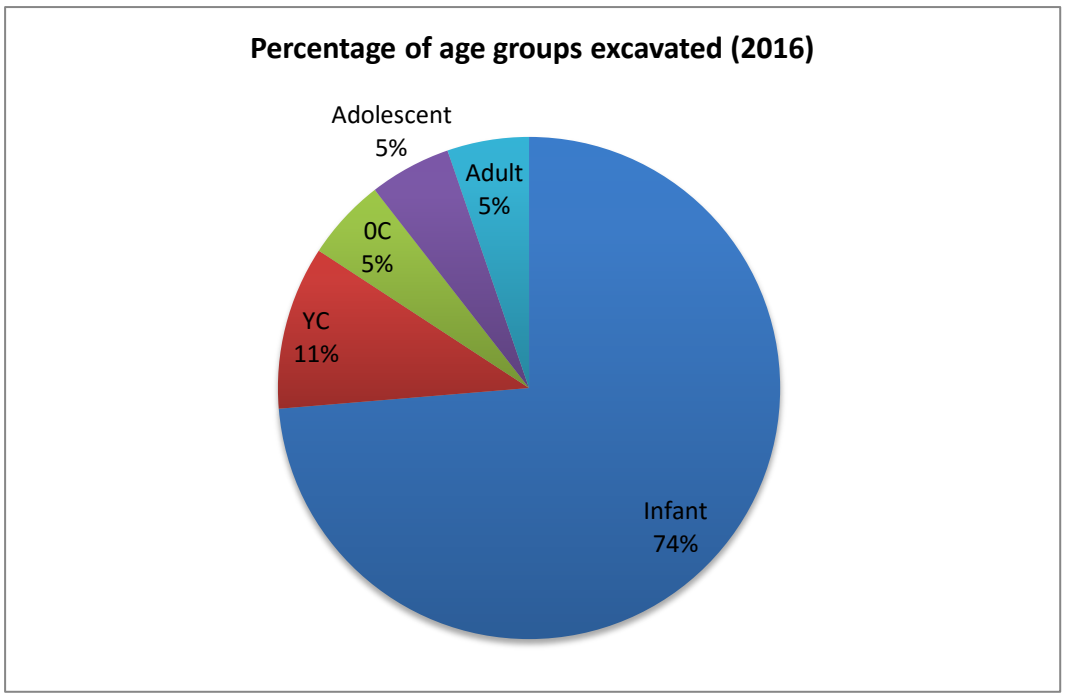

Figure 5.9. Percentage of age groups excavated in spring 2016.

With the additional 19 individuals, the overall current MNI from Space 50 is 48 individuals, with a further seven individuals and probably numerous others, which have not yet been excavated. The human remains excavated during this season have significantly increased the number of infants recovered from Space 50 (Table 5.5).

Age	**Number**
Infant	25
Young child	6
Older child	6
Adolescent	1
Adult	10
MNI	48

Table 5.5. Number of individuals in each age group.

Despite the addition of further adult remains from context C1810, it was not possible to estimate the sex of the skull from this deposit. Early field sex estimations of contexts C1784, C1788 and C1789, however, were confirmed (Table 5.6).

Sex	**Number**
Male	2
Female	1
F?	2
NP	5

Table 5.6. Number of sexed adult individuals.

The overall range of age groups represented in Space 50 remains similar, with infant individuals making up 52% of the assemblage (Fig. 5.10). The ratio of juveniles to adults remains high with only 10 adults out of 48 excavated individuals (21%).

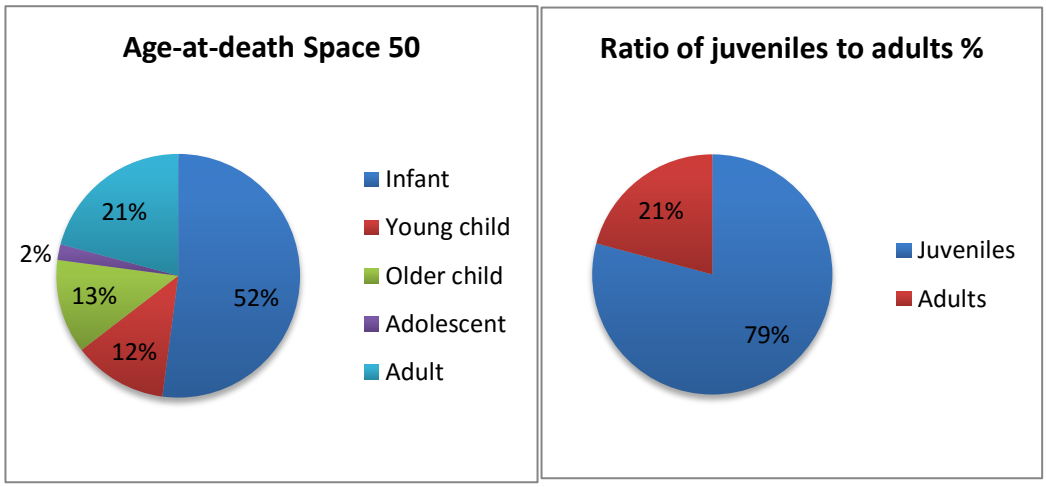

Figure 5.10. Percentage of age groups represented.

Evidence of palaeopathology is detectable in both adults and juveniles within C1775, C1788, C1789, and C1810. This adds to the previous evidence of physiological stress, malnutrition, and dental disease, which, with further analysis, will contribute towards a life-history of these individuals.

Most contexts had taphonomic alterations including: recent fragmentation, and fragmentation from sediment weight. Contexts C1754/C1774, C1775, C1781, C1789, C1810, and C1812 also had older fragmentation (potentially resulting from burial practice), manganese (or other dark staining), calcretions, and weathering. Contexts C1804 and C1810 had staining from red ochre. One cranial fragment from C1812 had a possible cut mark. Context C1810 contained an ulna with post-mortem fracturing potentially indicting alterations to the bone by humans.

Burial practices continue to be complex, ranging from scatters of small bones to more substantial areas of co-mingled and fragmented remains. Secondary burial practice seems to be the dominant rite within this phase of the building, now with additional levels of manipulation of the human remains. This is seen not only in the number of disarticulated skulls, but also in further elaboration with red ochre and a plaster-like material.

Future directions

The next stage of field work and analysis will continue in Space 50. It is possible that the human remains will continue throughout Space 50 which would greatly add to the current assemblage.

Further work on the demography and health of the assemblage will enhance our knowledge of Early Neolithic populations from this region. Further taphonomic analysis will be carried out to investigate post-mortem disarticulation via human agency. X-Radiography and SEM analysis will be carried out in order to clarify potential pathologies. Scientific analyses including radiocarbon dating, isotopic analysis, and aDNA will be carried out to answer questions about chronology, diet, movement, and identity.

Chapter Six: Small Finds

Amy Richardson

Research context and rationale

Previous seasons at Bestansur and Shimshara, along with research conducted into the finds from Sheikh-e Abad, have highlighted a series of key questions:

- To what extent is it possible to map patterns of material usage across the local and regional landscapes?
- How are these patterns of movement/exchange integrated with the spread of the Neolithic package around the Fertile Crescent?
- Are all material elements of the 'Neolithic package' visible at Bestansur?
- Is it possible to establish spatial and chronological patterns of activity and material engagement at Bestansur?

Research aims and objectives

This summary of the small finds recorded during the spring 2016 field season at Bestansur aims to provide a brief overview of those special finds which merit attention beyond the scope of the bulk finds summaries. Material resource usage is highlighted and preliminary portable XRF analysis conducted, where appropriate. The relationships between these artefacts are provisionally examined across the sites, setting them into a broader geographical context and elucidating their implications in terms of dating, where possible. This research aims to assess the potential of answering the key research questions through the artefactual evidence recovered from these archaeological investigations.

The data-set

Over the course of the 2016 spring season, a total of 74 objects (or groups of objects) were assigned SF numbers, 63 of which may be classified as belonging to Neolithic activities. These artefacts were catalogued, photographed and drawn, ready for storage at the Slemani Museum, and future integration into their collections.

From Bestansur, the artefacts were selected from a total of 2.3kg of animal bone, 12kg of pottery, 500g of fired clay, 300g of chipped stone and 5.8kg of ground stone, as having specific cultural significance. They are treated in this summary as material groups, rather than by context, in order to examine their significance in relation to the site and its relationship with the other Neolithic sites across the region. Chronologically, they have been simply divided into Neolithic and post-Neolithic, for the purposes of this report.

Research methods and approaches

In the field, SF numbers were assigned to artefacts during excavation, through heavy residue processing and by specialists conducting analysis (e.g. worked bone was highlighted by R. Bendrey during the zooarchaeological analysis). Each find has been catalogued, described, illustrated, photographed and is now held at the Slemani Museum, along with copies of the catalogues. Due to the constraints of the season, and the wealth of data previously collected, pXRF analysis was not conducted on the artefacts recovered in spring 2016.

Results to date

Worked bone

In contrast to previous seasons, animal bone was not processed during the field season. This process has been most fruitful in identifying worked bone during excavations. Consequently, only a single fragment of worked bone (SF627) was identified during the course of the 2016 season, although further fragments may be present in the animal bone assemblage. SF647 represents a cut and polished bone tool fragment, fractured at one end and along the length, obscuring its original form.

Cowries

Associated with the underfloor burials in Space 50, two cowries were recovered (SF590 and SF600), similar to those recorded in the summer 2014 field season (SF468 and SF470, C1731 Sk1; Fig. 6.1). All four cowries recovered over the course of two seasons have been located in Grid Square E of Space 50, indicating a localised, and possibly related, distribution, although SF600 was found in close association with the human remains of C1812 Sk8, and SF590 in slightly higher levels of the packing material to the north (C1803E). As was observed on the previous cowries recovered, traces of bitumen are evident in the rear and between the teeth of the cowries, indicating the use of a fixative to adhere the marine shells to another object, rather than strung as beads. No bitumen has yet been identified on the skeletal remains, and they may have been attached to a perishable substance.

SF600 represents a complete example of a cowrie with cut apex, with a smoothed surface and bituminous sediment in the rear. Based on size and morphology, the species is likely to be the same as those previously identified as *Cypraea monetaria moneta*, from the Persian Gulf. The recovery of these shells, treated in similar ways, yet in association with two separate burial clusters, suggests repeated activities of treating selected individuals, differentiated by material practices, but receiving the same secondary burial as others across the space and with the skull clusters.

Figure 6.1. Complete cowrie SF600, half cowrie SF590, and half cowrie SF470.

The fragmented nature of SF590 raises further questions. Cut and smoothed in a similar fashion to the other cowries recorded, this fragment bears the labial teeth, whereas SF470 represents the columellar teeth. Further investigation is required to confirm whether or not these two halves pertain to the same shell, although it seems likely, since SF590 shares the fracture at the anterior canal and retains the spire, which is absent from SF470, making the former a little longer than its counterpart. However, it may be that two halves of the same cowry were used and displayed separately, as the bituminous residues in the respective halves do not correspond.

Stone

Four Neolithic stone objects and tools were recorded, including half a limestone disc with central perforation (SF588) from mixed fill in the western extension of Trench 10, similar to those found in previous seasons of excavation across the site. A conical stone tool (SF639; Fig. 6.2), possibly for retouching chipped stone was also retrieved from mixed deposits in the western extension (C1830). The tool has shafts drilled

from the base and terminal to meet internally for hafting or mounting, similar to those of SF188, a stone tool from Trench 9. Wet-sieving of material from the previous season in Trench 10 also recovered a polished pebble in the shape of a horn (SF568), from material surrounding human bones in Sp50 C1784, and a small marble polisher (SF562; Fig. 6.2) from Sp27 C1772 in the deep sounding south of Building 5. The latter is a grey marble cylinder, with a rounded tip and coarsely broken terminal, parallel sided, with faceting along the length. This faceting may be the result of polishing which has left sheen and striations around the circumference; the tool may have been suitable for the polishing of the internal surfaces of stone bowls or bracelets.

Figure 6.2. Stone tools SF639 and SF562.

Adornment

Of the 65 SF numbers assigned to Neolithic finds over the course of the season, 54 belong to the adornment class. These adornments comprise a total of 102 beads: 63 shell beads, 15 red dentalium disc beads, 13 red dentalium barrel beads, 5 white dentalium disc beads, a single complete tusk shell, and 5 stone beads. Two grey marble disc beads and a broken alabaster cylinder bead (SF563, SF567, and SF652) were recovered during wet-sieving of material previously excavated from the deep sounding south of Building 5, which find no comparable examples within the building. The beads inside Space 50 were deposited in the packing material beneath the floors - 70 beads were recorded from C1803, many of which were concentrated in the southern area around Grid Square E. These were all closely similar to those recovered in the packing material (C1811) immediately surrounding a cluster of skulls in the south of Sp50 (C1812).

Figure 6.3. Shell and dentalium beads (SF561), green chalk bead (SF630), and carnelian bead (SF651).

This cluster included one particularly unusual bead in a soft green chalk (SF630; Fig. 6.3). The vibrant green colour on excavation swiftly faded to white, as the calcium-rich stone dried. Lozenge-shaped flat beads are common across Neolithic Southwest Asia, with a similar example in green chlorite documented at Jarmo (Moholy-Nagy 1983, 298, figs 136.10 and 142.6). Most strikingly, towards the end of the season, a large

carnelian flat bead (SF651; Fig. 6.3) was found on top of sacks next to the section of Trench 10, potentially having spilled out of the section. This unstratified bead is similar in size and shape to SF451, a red jasper flat bead found in packing associated with human remains in Space 50. The highly polished SF651 is semi-translucent, with evident nibbling at the edges of the perforation running through the centre of the asymmetrical, wide lozenge (or biconical) shape. The unstratified bead finds parallels in both material and shape at Bestansur, demonstrating elements of Neolithic working techniques, although we do not have contextual information to tie it in to activities on the site.

Each of the beads recovered by hand, as opposed to whole-earth wet-sieving, were planned during the course of the excavations, in order to examine the exact distribution patterns. This process has highlighted that rather than being deposited in discrete clusters, or strung around the human remains, the beads are scattered throughout the packing material, with concentrations of beads in localised areas that do not appear to have been directly associated with one another. This seemingly random distribution ties in to questions regarding the depositional processes for the human remains: were the bodies of individuals adorned with strings of beads prior to burial, which were later carefully deposited with the disarticulated remains? Or were beads scattered into the packing during the secondary burial of the remains? These practices appear to have held particular significance in Space 50, where very few items of material culture have been deliberately incorporated with the human bone, and the sediment selected for use as packing is largely sterile.

Clay

In accordance with the low levels of material culture deposited with the burials in underfloor packing in Space 50, only four Neolithic clay objects were recorded over the course of the season. These included a clay ball token (SF638; Fig. 6.4) from the wall collapse and fill in the north of Trench 10, and a squashed clay token with flattened base (SF637) from mixed deposits in the western extension of Trench 10. One clay object was recovered in three fragments (SF602) from the human remains cluster abutting the eastern wall of Trench 10 (C1810). The deliberately-shaped fired clay object has one smoothed surface, and appears similar in shape to conical or triple wing-based figurines. A second possibly figurative object (SF649; Fig. 6.4) was identified in the lower levels of the western extension of the trench (C1830). The lightly fired object was too fragile to extract from the surrounding sediment and has been conserved in its surrounding packing material. The section demonstrates a curved rear and extrusions that may be limbs.

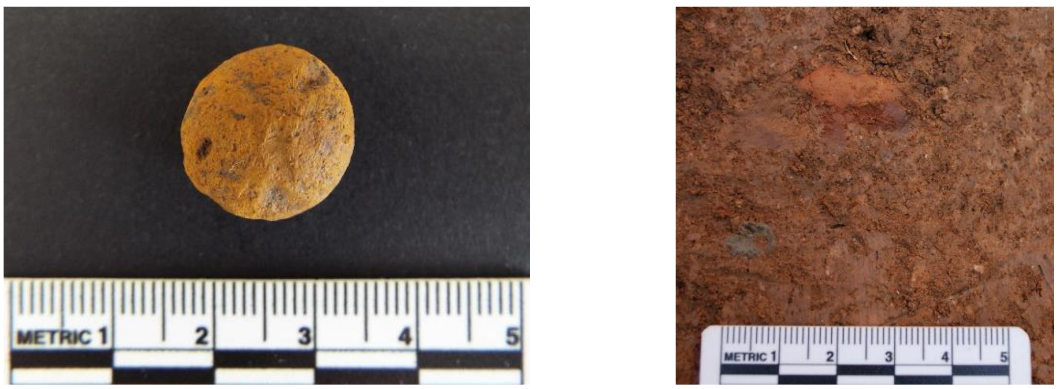

Figure 6.4. Clay ball token (SF638), and shaped clay object (SF649) in situ.

Post-Neolithic objects

Nine objects were recorded from post-Neolithic contexts, including two clay loom-weights, a small pot-lid, a clay pipe, an iron nail, and a fragment of worked stone with deep incisions. One curved stone fragment may pertain to a bracelet (SF650), and two complete bronze disc pins were recovered (SF633 and SF636). The composite pins have drop-shaped heads with nacre inlay inset with bronze ring-and-dot decoration, and a bronze boss. The pins are similar, although not identical, and were retrieved from separate contexts in the mixed fill of the western extension of Trench 10. Both pins have an upper suspension loop, and SF636 is perforated at the side, suggesting that these pins once belonged to a more elaborate hair or dress ornament.

Future directions

This brief summary of the finds demonstrates the degree of continuity in the material practices of the inhabitants of Space 50 at Bestansur. Key features, however, have been highlighted in the area-specific concentrations of beads around Grid Square E. These data will be merged with that from previous seasons, to better outline the extent of the bead clusters and the variations in bead type. In future seasons of excavation in this space, the likely presence of beads in these areas should be considered, and material from the southern portion of Space 50 should be wet-sieved, although beads no longer require individual plotting. The range of bead materials from this space is remarkable and points to wide-reaching networks of exchange operating across the region. The provenance of the materials is not easy to establish in many cases, but further investigation of carnelian sources should be undertaken when possible. The rare occurrence of clay artefacts amongst the burials highlights the significance attached to those that were deposited with human remains, and further highlights the special treatment accorded to figurine SF532. Further work needs to be done on securing the clay shapes too fragile to extract from the sediment, and these should be recorded *in situ* where they cannot be block-lifted.

Table 6.1. Small finds recorded during the spring 2016 field season.

T#	C#	Item	Material	Period	Description
10	1811	Shell beads (5)	Shell	Neolithic	Five pierced mollusc beads
10	1803	Dentalium and shell beads (15)	Shell; dentalium	Neolithic	Three dentalium barrel beads, seven red disc beads, two white disc beads and three pierced mollusc beads
10	1772	Stone polisher	Marble	Neolithic	Pale grey marble cylinder, broken at one end, with rounded tip at other. Some facetting and polished sheen around circumference. Could have been used for bowls or bracelets.
10	1772	Pale grey disc bead	Marble	Neolithic	Pale grey disc bead made from stone, likely marble, in style of dentalium disc beads but larger. Very thin and finely worked.
10	1803	Dentalium and shell beads (16)	Shell; dentalium	Neolithic	Six dentalium barrel beads, four red disc beads, one white disc bead, five pierced mollusc beads
10	1811	Shell beads	Dentalium; shell	Neolithic	Ten pierced shell beads and one red dentalium barrel bead.
10	1772	Disc bead	Stone	Neolithic	Grey-white disc bead with narrow central perforation, similar to dentalium disc beads in style.
10	1784	Polished pebble	Stone	Neolithic	Beige-brown, polished, horn-shaped pebble.
10	1784	Dentalium beads (4)	Dentalium	Neolithic	Dentalium disc beads: 2 red and 2 white
10	1803	Shell beads	Shell	Neolithic	GRID E: Two pierced white mollusc beads
10	1821	Red disc beads	Dentalium	Neolithic	Two red dentalium disc beads
10	1816	Perforated disc	Limetone	Neolithic	Perforated stone disc with central hole drilled from both sides. Rounded edges, smoothed surface, one side covered in concretions. No evidence for cause of fracture.
10	1811	Shell bead	Shell	Neolithic	White mollusc bead with single perforation.
10	1803	Cowrie shell	Cowrie	Neolithic	GRID E: Half a white cowrie with cut apex, fragmented at weakest points (ancient break, other half not proximate). Black residues between teeth indicate bitumen adhesive affixed

T#	C#	Item	Material	Period	Description
					cowrie to another object. Some orange staining on outer surface.
10	1803	Dentalium bead	Dentalium	Neolithic	GRID E: Tiny, dark red dentalium, barrel-shaped bead, with fracture at the edges. Slightly tapering.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1811	Shell bead	Shell	Neolithic	White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1811	Cowrie shell	Shell	Neolithic	GRID E: Complete cowrie shell with cut apex to create narrow profile. Surfaces appear smoothed or worn. Recovered near to skulls, facing upwards, with bituminous residies in rear.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1810	Clay object	Clay	Neolithic	Small clay object in three fragments, with triangular section. Clay is fired drak brown-black and deliberately shaped. Smoothed on one surface, irregular on the others. Form is almost complete and bears some similarity to conical or triple wing-based figurines.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1819	Ferrous pin	Iron	Post-Neolithic	Heavily corroded iron pin/nail, with curved head, in two fragments.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1811	Shell bead	Shell	Neolithic	White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
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10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Dentalium tusk bead	Dentalium	Neolithic	GRID E: White dentalium tusk shell bead, with cut and smoothed terminals.
10	1803	Red barrel bead	Dentalium	Neolithic	GRID E: Tiny, dark red dentalium barrel bead, with central perforation, slightly tapering.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1803	Shell bead	Shell	Neolithic	GRID E: White mollusc bead with single perforation.
10	1811	Green chalk bead	Stone	Neolithic	Small, lozenge-shaped flat bead made from soft, chalky stone. Green is vibrant spearmint green when wet and green-tinged white when dry. Abrasion and hardness suggests a calcium rich stone, possibly chalk with some copper content to cast blue-green hue.
10	1811	Shell bead	Shell	Neolithic	White mollusc bead with single perforation.
10	1824	Bronze disc pin	Copper alloy	Post-Neolithic	Bronze composite disc pin with pear-shaped head. Decortive panel with nacre inlay and bronze boss. Upper suspension loop. Pin is bent. Possible traces of gilding on upper pin.
10	1828	Loom weight	Clay	Post-Neolithic	Biconical clay loomweight
10	1828	Clay lid	Clay	Post-Neolithic	Small lid of clay vessel. Complete, with uneven lug. Finger-pressed and lightly fired.

T#	C#	Item	Material	Period	Description
10	1828	Bronze disc pin	Copper alloy	Post-Neolithic	Bronze composite disc pin with pear-shaped head. Decortive panel with nacre inlay and bronze boss. Ring and dot decoration on inlay. Upper suspension loop and side perforation for linking.
10	1823	Clay object	Clay	Neolithic	Small fragment (50%) of squashed clay object with flattened base and pinched top. Fired to black.
10	1828	Clay ball	Clay	Neolithic	Small, yellow-red clay ball token. Deliberately shaped and fired. Oblate spheroid.
10	1830	Stone tool	Stone	Neolithic	Stone (granite?) tool, possibly used for retouching chipped stone. Conical, with pointed tip broken. Holes drilled into end and base for hafting/mounting. Cf. SF188 (C1320, T9, complete). Stone is very pale brown and coarse. Soil from perforations conserved for future analysis.
10	1830	Loomweight	Clay	Post-Neolithic	Biconical clay loom weight with fracture across two surfaces.
10	1803	Shell bead	Shell	Neolithic	GRID E: Mollusc bead
10	1803	Shell bead	Shell	Neolithic	GRID E: Mollusc bead
10	1803	Shell bead	Shell	Neolithic	GRID E: Mollusc bead
10	1803	Red barrel bead	Dentalium	Neolithic	GRID E: Fragment (50%) of redd dentalium barrel bead.
10	1803	Shell bead	Shell	Neolithic	GRID E: Mollusc bead
10	1830	Pipe	Clay	Post-Neolithic	Bowl of Ottoman clay pipe.
10	1831	Worked bone	Bone	Neolithic	Small fragment of cut and polished bone; fractured at one end and along length.
10	1833	Worked stone	Stone	Post-Neolithic	Rough pink stone with deeply incised cut marks to form regular cross pattern on either side. Fractured across all edges.
10	1803	Clay object	Clay	Neolithic	Lightly fired clay shape with defined edges and variable firing. Very fragile, so preserved in surrounding packing material and recorded in section. Curved rear and extruded limbs indicate deliberately shaped and possibly a figurine. Similar to lightly fired clay shapes identified across the site, which are too fragile to excavate.
10	1834	Black bracelet fragment	Stone	Post-Neolithic	Fragment of black bracelet with simple section and slight facetting. Working striations visible along inner edges. Approx 50% coated in concretions. Made from very lightweight stone, or potentially petrified wood/ebony.
10	1831	Orange flat bead	Carnelian	Neolithic	Orange, translucent carnelian flat bead with highly polished surface and visible impurities in matrix. Edges are subrounded to form asymmetrical lozenge/diamond shape. Light nibbling around perforation. No drill marks visible. Drilled from both ends, narrowing perforation towards centre.
10	1772	White cylinder bead	Alabaster	Neolithic	White alabaster bead fragment, from cylinder bead, likely alabaster, with perforation tapering towards centre from drilling at both terminals. Slightly rounded at ends. Highly polished. Possible breakage during manufacture. Estimated complete size: 15mm x 8mm.

Bibliography

Aufderheide, A. C. and Rodríguez-Martin, C. 1998. *The Cambridge encyclopaedia of human Palaeopathology*. Cambridge: Cambridge University Press.

Baker, B. J., Dupras, T. L. and Tocheri, M. W. 2005. *The Osteology of Infants and Children*. Texas, A&M University Press.

Behrensmeyer, A. K. 1978. Taphonomic and ecologic information from bone weathering. *Paleobiology* 4 150-62.

Boivin, Nicole L. 2000. Life rhythms and floor sequences: excavating time in rural Rajasthan and Neolithic Çatalhöyük. *World Archaeology* 31 (3):367-388.

Braidwood, L., R. Braidwood, B. Howe, C. Reed, and P.J. Watson, eds. 1983. *Prehistoric Archaeology Along the Zagros Flanks*. Chicago: The University of Chicago Oriental Institute.

Brickley, M. and McKinley, J. 2004. Guidance to standards for recording human skeletal remains. *Reading: Institute of Field Archaeologists and British Association of Biological Anthropology and Osteoarchaeology, University of Reading*.

Brothwell, D. 1989.The relationship of tooth wear to aging. In M.Y. Ìşcan (ed) *Age markers in the human skeleton*. Illinois: Charles C Thomas; 303-317.

Brooks, S. and Suchey, J. M. 1990. Skeletal age determination based on the os pubis: a comparison of the Acsádi-Nemeskéri and Suchey-Brooks methods. *Human Evolution* 5: 227-238.

Buckberry, J. L. and Chamberlain A. T. 2002. Age estimation from the auricular surface of the ilium: a revised method. *American Journal of Physical Anthropology* 119 231-239.

Buikstra, J. E. and Ubelaker, D. H. 1994. *Standards for data collection from human skeletal remains*. Arkansas: Arkansas Archaeological Society.

Coqueugniot, E. 2000. Dja'de (Syrie), un village à la veille de la domestication (seconde moitié du IXeme millénaire av. J. C. In J. Guilaine (ed.) *Premiers paysans du monde, naissances des agricultures*. Paris, Errance: 63-79.

Fisher, K. D. 2009. Placing social interaction: An integrative approach to analyzing past built environments. *Journal of Anthropological Archaeology* 28 (4):439-457.

Goodman, A. H., and Armelagos, G. J. 1989. Infant and childhood morbidity and mortality risks in archaeological populations. *World Archaeology* 21: 225-243.

Haglund, W. D. 1997. Chapter 23. Dogs and Coyotes. In W D. Haglund and M.H. Sorg. (eds) *Forensic Taphonomy: the post-mortem fate of human remains*. Boca Raton: CRC Press, 368-373.

Iversen, I. 2013a: Microarchaeology. In: R. Matthews, W. Matthews and K. Rasheed Raheem (eds). *Excavations at Bestansur, Sulaimaniyah Province, Kurdistan Regional Government, Republic of Iraq 21st March - 24th April 2013*. Unpublished Central Zagros Archaeological Project Archive Report: 165-84.

Iversen, I. 2013b: Microarchaeology. In: R. Matthews, W. Matthews and K. Rasheed Raheem (eds). *Excavations at Bestansur and Shimshara, Sulaimaniyah Province, Kurdistan Regional Government, Republic*

of Iraq 18th August - 27th September 2012; Survey in Zarzi Region January 2013. Unpublished Central Zagros Archaeological Project Archive Report: 76-83.

Iversen, I. 2014: Microarchaeology. In: R. Matthews, W. Matthews and K. Rasheed Raheem (eds). *Excavations at Bestansur, Sulaimaniyah Province, Kurdistan Regional Government, Republic of Iraq 22nd March -27th April 2014*. Unpublished Central Zagros Archaeological Project Archive Report: 25-36.

Knüsel, C. 2005. The physical evidence of warfare- subtle stigmata? In M. Parker Pearson and I. Thorpe (eds) *Warfare, violence and slavery in prehistory*. Oxford: Archaeopress: 49-66.

Kuijt, I., Guerrero, E., Molist, M. and Anfruns, J. 2011. The changing Neolithic household: household autonomy and social segmentation, Tell Halula, Syria. *Journal of Anthropological Archaeology* 30: 502-22.

Lovejoy, C. O. 1985. Dental wear in the Libben population: its functional pattern and role in the determination of adult skeletal age at death. *American Journal of Physical Anthropology* 68*:* 47-56.

Moholy-Nagy, H. 1983. Jarmo artefacts of pecked and ground stone and of shell. In: L.S. Braidwood, R.J. Braidwood, B. Howe, C.A. Reed, and P.J. Watson (eds). *Prehistoric Archaeology Along the Zagros Flanks.* Oriental Institute Publications 105. Chicago, University of Chicago: 289-346.

Molist, M., ed. 2013. *Tell Halula: un poblado de los pirmeros agricutores en el valle del Eufrates, Siria. Tomo 1.*: Ministero de Educacion, Cultura y Deporte.

Moore, A. M. T. and Molleson, T. I. 2000. Disposal of the dead. In A. M. T. Moore, G. C. Hillman and A. J. Legge (eds) *Village on the Euphrates. From Foraging to Farming at Abu Hureyra*. Oxford, Oxford University Press: 277-99.

Ortner, D. 2003*. Identification of pathological conditions in human skeletal remains.* USA: Academic Press.

Özdoğan, A. 1999. Çayönü. In M. Özdoğan and N. Başgelen (eds). *Neolithic in Turkey. The Cradle of Civilization*. Istanbul, Arkeoloji ve Sanat: 35-53.

Pinhasi, R., Fernandes, D., Sirak, K., Novak, M., Connell, S., Alpaslan-Roodenberg, S., Gerritsen, F., Moiseyev, V., Gromov, A., Raczky, P. and Anders, A. 2015. Optimal ancient DNA yields from the inner ear part of the human petrous bone. *PloS one* 10.6: p.e0129102.

Schaefer, M., Scheuer, L. and Black, S. M. 2009. *Juvenile Osteology: a Laboratory and Field Manual*. London, Academic Press.