Central Zagros Archaeological Project

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

15th August – 2nd October 2013

Archive Report

Excavations underway in Building 5, Trench 10, Bestansur, looking north-east

Preface

A fourth season of excavations at the site of Bestansur took place in Summer 2013 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 is 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'. A second short period of work also took place at Shimshara on the Rania plain.

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 representative, Kamal Rouf Aziz, gave support and advice in a great many ways as well as serving as a key team member. We thank the villagers of Bestansur who worked with us on site and looked after us in the Expedition House, as well as the villagers and guards of Bozkin, Rania, who looked after us during our work at Shimshara.

The Summer 2013 team comprised:

Roger Matthews	University of Reading	Co-Director, lithics, excavation
Wendy Matthews	University of Reading	Co-Director, micromorphology, excavation
Kamal Rasheed Raheem	Sulaimaniyah Antiquities	Co-Director
Kamal Rouf Aziz	Sulaimaniyah Antiquities	Representative, excavation,
Robin Bendrey	University of Reading	Archaeozoology, excavation
Amy Richardson	University of Reading	Finds, data, pXRF
Ingrid Iversen	University of Reading	Micro-archaeology, excavation
Pascal Flohr	University of Reading	Excavation, geoarchaeology
Matt Bosomworth	University of Reading	Excavation
Tom Moore	University of Reading	Excavation
Miles Tysoe	University of Reading	Excavation
Rory Williams-Burrell	University of Reading	Excavation
Agnieszka Trambowicz	University of Reading	Excavation
Salman Xosravi	Bu Ali Sina University	Excavation, micro-archaeology
Golnaz Ahadi	Tehran University	Archaeobotany, lithics

The following report is a preliminary, provisional account of the results from the Summer 2013 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 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 five seasons of excavation at the Neolithic site of Bestansur and two seasons at 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.

Chapter Two: Excavations in Trench 10

Roger Matthews, Kamal Rouf Aziz & Wendy Matthews

Introduction

Trench 10 on the east side of the mound at Bestansur formed a major focus of investigation during the Summer 2013 season. Trench 10 was initially opened as a 2 x 2m trench in the first season at Bestansur in Spring 2012, and was subsequently expanded into a 6 x 6m trench in Spring 2013. As articulated in the Spring 2013 archive report, towards the end of the Spring 2013 season a well-preserved pisé wall (Wall 12, C1420) was exposed in the lower levels of Trench 10, and it was decided to expand Trench 10 in the Summer 2013 season in order to trace this wall and to search for further well-preserved walls in potential association with Wall 12. This strategy proved very effective in the Summer 2013 season, as we have now recovered the plans of two well-preserved buildings in Trench 10, Buildings 8 and 5. Excavation of these buildings will continue in the Spring 2014 season at Bestansur. The layout and location of Trench 10 are shown in Figs 2.1-2.2. The matrix of all excavated deposits in shown in Fig. 2.3.

Excavations of Buildings 5 and 8 at Bestansur are shedding important light on architecture, use of space and possible cultic activity in the Early Neolithic of the Central Zagros. Of special note is the structured deposition of human remains in packing layers between the two buildings. The excavation of stratified sequences of external deposits adjacent to the buildings also provides the opportunity for comparison of internal and external areas and associated activities.

A major development has been the establishment of a secure radiocarbon date on animal bone from context C1412, with a 2-sigma calibrated range of 7720-7580 BC (Beta-368934). The dated bone is from an external area surface overlying Wall 12 (see below). This radiocarbon date indicates a clear Pre-Pottery Neolithic B dating for the Neolithic buildings and deposits in Trench 10, in strong agreement with the chronology suggested by the chipped stone tools of chert and obsidian.

The report here discusses deposits and features in their true chronological order, in reverse sequence to the order of excavation.

Excavation of Building 8

Parts of a very well-constructed building, Building 8, were exposed and excavated in Summer 2013 (Fig. 2.4). Building 8 is unlike all previously excavated structures at Bestansur in that its walls are constructed of mud bricks rather than pisé. The bricks are up to 70cm long and 60cm wide and only 4-6cm thick, with tapering edges (sometimes known as 'boat-shaped bricks'). They are set in layers of mortar and the walls are lavishly coated with multiple applications of plaster of varying textures and hues (Fig. 2.5). The walls of Building 8 are substantial, ranging from 60-70cm in width, and Building 8 overall appears to be well laid-out. Its plan so far is only partial, as it is overlain by the partially excavated walls and deposits of Building 5 (Fig. 2.6). The plan so far indicates an open portico, facing south-east, Space 54, with an offset plastered entrance leading into Space 50, a rectangular room 3.5 x 2.5m in area. A small trench in Space 54, against the face of Walls 46 and 48, involved excavation down to the uppermost floor, on which were clear traces of organic basketry or woven matting in association with a shaped alabaster stone (Fig. 2.7). A small sample of deposits was also excavated in Space 55 to the south-west of Wall 46. We intend to expose the complete plan of Building 8 in Spring 2014.

Deposits between Buildings 8 and 5

A distinctive set of deposits containing human remains was excavated in the fill lying between Buildings 8 and 5, under the floors of Space 50 in the north-west area of the trench. Our provisional interpretation is that these deposits relate to deliberate deposition of disarticulated human remains to mark the closure of Building 8 and/or the foundation of Building 5. The human remains are in fragmentary state, but so far there are at least three skulls and multiple separate teeth and other human bones (Figs 2.8-2.9), mainly from juvenile individuals. They do not appear to be primary burials. Stone and shell beads occur in association with the human remains. Further excavation and analysis of these remains will continue in Spring 2014.

Excavation of Building 5

Overlying the plan of Building 8 is another structure, Building 5, which in some respects follows the plan of the underlying building, Building 8 (Fig. 2.6), but in most regards is very different. As with other buildings excavated at Bestansur so far, Building 5 is constructed of red and white pisé, rather than mud brick used in Building 8. The main external wall of Building 8, Wall 50, is used as a foundation for Wall 38 of Building 5, but using red and white pisé rather than mud-brick (Fig. 2.5). Similarly, Wall 49 of Building 8 survives into Building 5, Space 47 as a low bench parallel with Wall 37. Other walls of Building 5 are new constructions built over the top of fill and levelling material packing the rooms of Building 8 (Fig. 2.10).

Most of the exposed rooms of Building 5 were excavated in Summer 2013 but much of the building lies beyond the trench edges to the north and west, where excavations in Spring 2014 will focus. Walls 45, 51 and 38 appear to form an outer edge to Building 5, with Spaces 52 and 53 thus being located outside the building. As with Building 8, Building 5 has a portico-type space facing south-east, Space 40, which provides entry to a large rectangular room, Space 47, measuring 6.85 x 2.3m in area. To the south-west of the portico at least two small rooms are situated, Spaces 42 and 44. The relationship of the entrance Spaces 40 and 42 of Building 5 to the long wall, Wall 12, with its return reaching into the middle of Space 42 is as yet unclear but, as the surfaces of Space 42 overlie Wall 12, our interpretation is that Wall 12 was built at the end of the life of Building 8 in an interim phase before the construction of Building 5. Our discussion of Building 5 here starts from the south of the trench and moves northwards.

In Spaces 27 and 43, thin lenses of external deposits and surfaces were excavated. These deposits can be associated with those excavated in Spring 2013 in Trench 10, sloping down from west to east away from the mound. One of these deposits, C1412 excavated in Spring 2013, yielded the animal bone which provides the radiocarbon date discussed above. To the west of Building 5's entrance, Space 42 included a well-defined spread or accumulation of mainly small stones distributed across the eastern half of the room against Walls 31 and 32 (Fig. 2.11). A fine alabaster stone tool was found against the face of Wall 31 in Space 42 (Fig. 2.12).

Space 40 is of special significance as the entrance into Building 5, formed by two flanking walls, Walls 30 and 31 either side of portico 3.15m wide. Adjacent to the inner faces of Walls 30 and 31 on the uppermost floors of this phase were several deliberately placed large stones (Fig. 2.13). Stone 1 against Wall 31 is especially notable in that its surface is covered in multiple cut marks and drill holes, some of which appear to take quite deliberate forms or shapes (Figs 2.14-2.15). Many of the fine cut marks are suggestive of use of the stone in some form of craft activity involving repeated slicing and drilling.

Space 47 is the main room so far excavated of Building 5 (Fig. 2.16). It measures 6.85 x 2.3m. Its interior wall faces have occasional traces of vivid red pigment. A whitish wash extended over the floors and a low bench against the north face of Wall 37, formed by the surviving top of Wall 49 of the underlying Building 8. Finds on the floor of Space 47 included a bell-shaped pestle located close to a large threshold stone at the doorway from Space 47 into Space 50, a small pierced stone disk and two broken, long, thin obsidian blades.

In Space 50 the earliest excavated deposits are those containing the diffuse human remains discussed above. Overlying these remains was a series of floors and packing. In the lower phase of occupation, above the human remains deposit, small stones had been carefully placed along the wall edges of Walls 41 and 42 in Space 50, perhaps for drainage purposes (Fig. 2.17). A distinctive deposit of large flat stones was placed over these small stones and incorporated into an upper phase of flooring against the grey-plastered face of Wall 41 (Fig. 2.18).

Underlying the earliest floor of Space 49 were clear traces of a wall of the underlying Building 8 (Fig. 2.4). Deposits within Space 49 were relatively clean and free of finds (Fig. 2.19). The adjacent room, Space 48, consists entirely of an in situ oven, with multiple burnt clay linings and a deep accumulation of ash. The ash was topped by an upturned grindstone and a stone mace-head was also found in the upper ash deposits (Figs. 2.20-2.21).

Mixed and post-Neolithic deposits

Overlying the walls and deposits of Building 5 were lenses of disturbed Neolithic deposits, cut by several pits. A layer of stone packing, with sherds and redeposited Neolithic chipped stone materials, covered much of the trench, and a single clay-lined oven was also excavated in the upper levels. The whole trench lies in a currently ploughed field and is therefore topped with plough-soil.

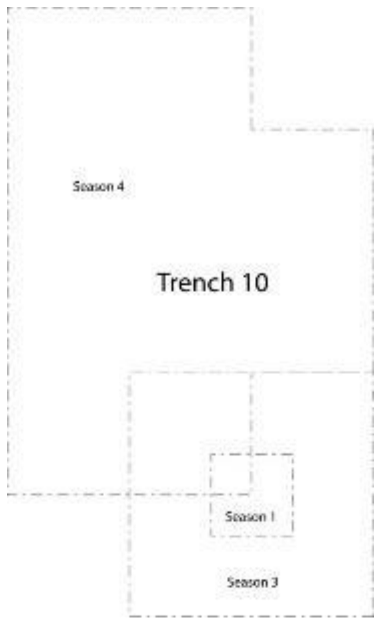

Figure 2.1. Layout of Trench 10. Season 1 trench is 2 x 2m.

Figure 2.2. View of Trench 10, looking north-west.

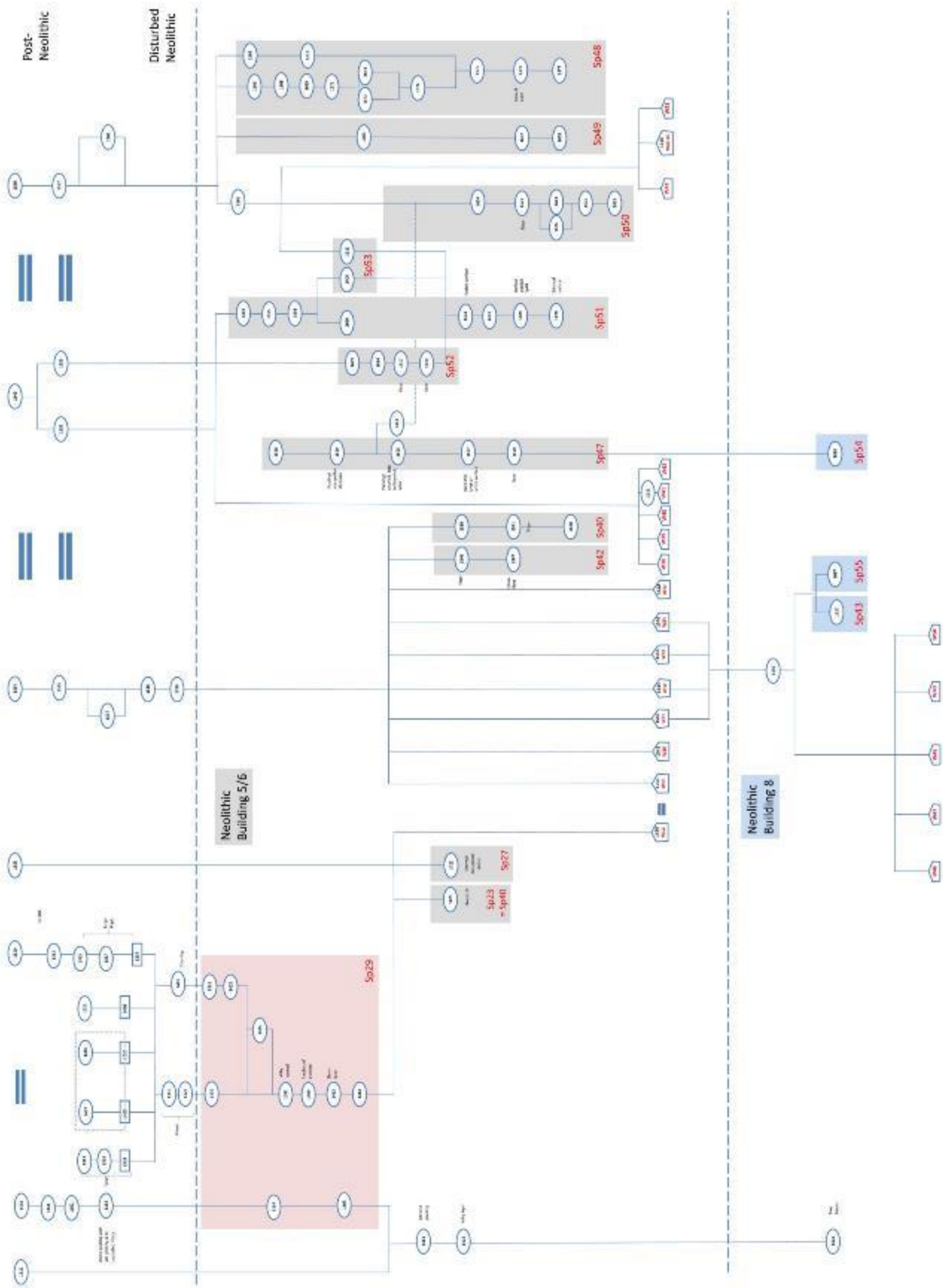

Figure 2.3. Matrix of excavated deposits in Trench 10.

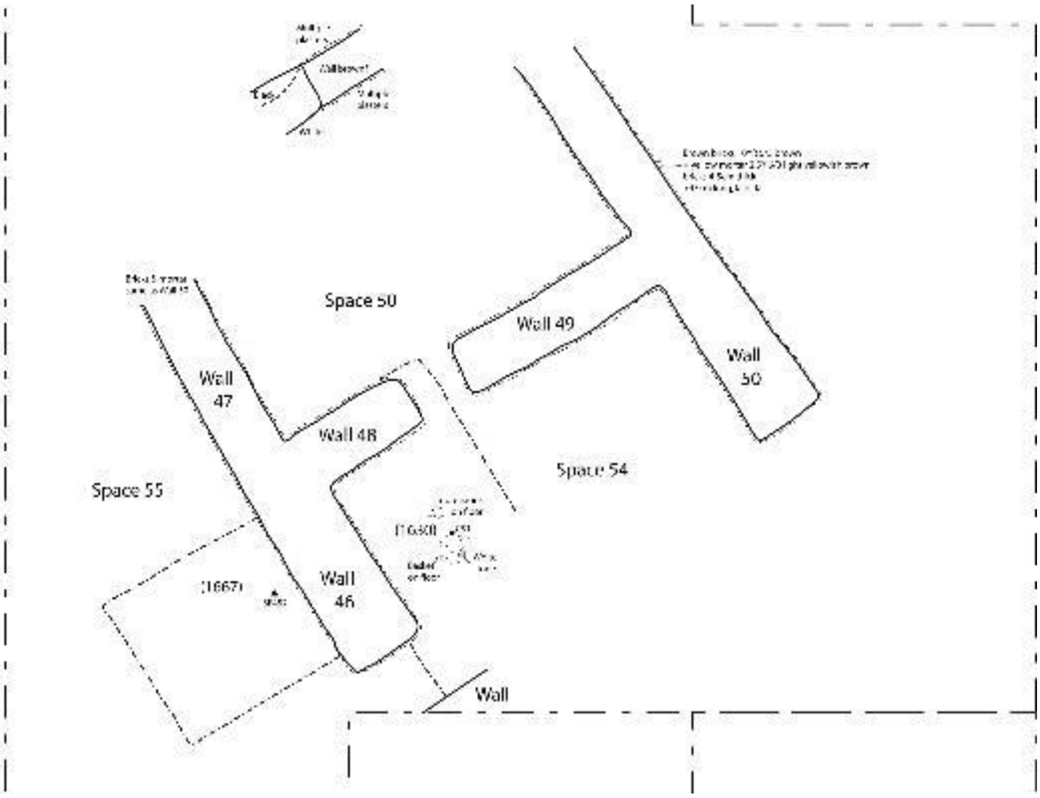

Figure 2.4. Plan of Building 8, Trench 10.

Figure 2.5. Wall 50, Building 8, looking north-east, after removal of overlying pisé wall of Building 5, showing dark brown mud bricks set in pale yellow-brown mortar, with plastered faces.

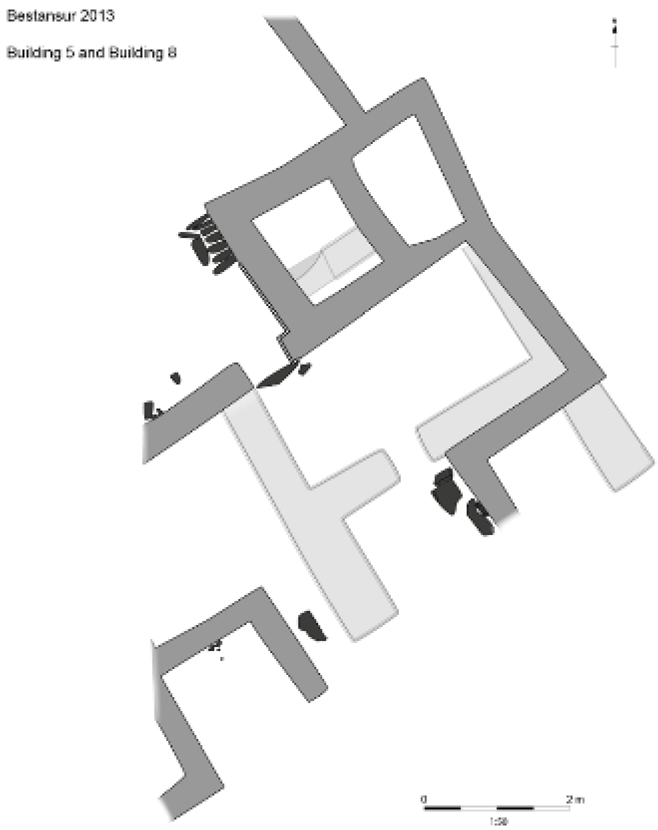

Figure 2.6. Plan to show relationship of Buildings 8 and 5.

Figure 2.7. Building 8, Space 54, looking north-west. Circular traces of basketry or matting in centre with white alabaster stone.

Figure 2.8. Excavated human remains in Space 50, between Buildings 8 and 5.

Figure 2.9. Excavated human remains in Space 50, between Buildings 8 and 5.

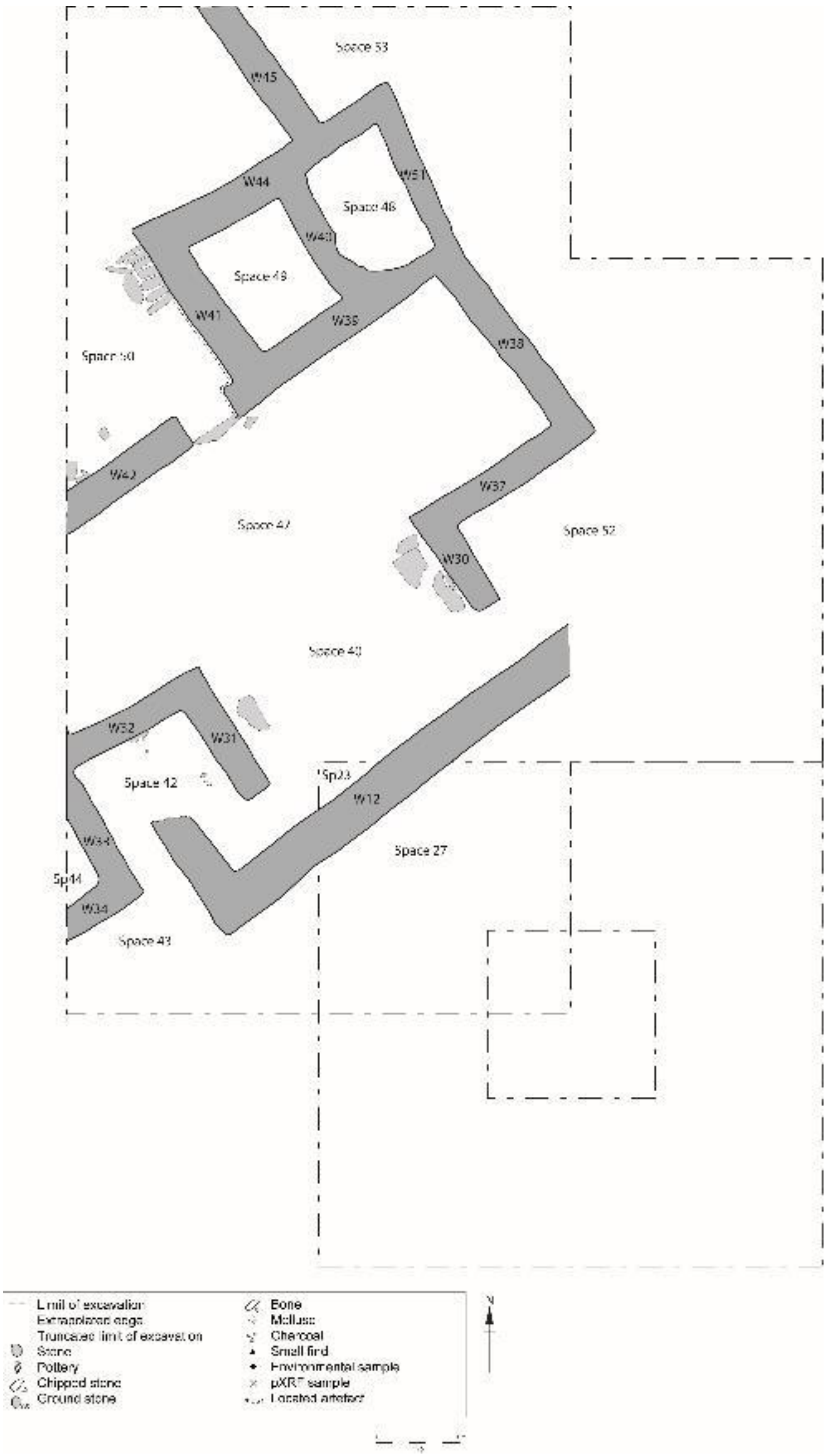

Figure 2.10. Plan of Building 5.

Figure 2.11. Spread of stones in Space 42, Building 5, looking south-east with Wall 31 on the left.

Figure 2.12. Alabaster stone tool against Wall 31, Space 42.

Figure 2.13. Large stones lining entrance to Building 5, Space 40, looking north.

Figure 2.14. Stone 1, Space 40, showing cut marks and drill holes.

Figure 2.15. Stone 1, Space 40, detail of cut marks and drill holes.

Figure 2.16. Building 5, Space 47, looking north, with Spaces 48-50 beyond.

Figure 2.17. Building 5, Space 50, looking south-east, showing deposits of small stones against wall faces of Walls 41 (left) and 42 (at back), with doorway into Space 47.

Figure 2.18. Flat stones in situ on floor of Space 50 against west face of Wall 41.

Figure 2.19. Building 5, Space 49 (centre), looking south-east, with sampling baulk left in south-east corner of room.

Figure 2.20. Section through Space 48 after excavation of south-east half of room, looking north-west. Upturned grindstone top centre.

Figure 2.21. Stone mace-head in upper ash deposits of Space 48, Building 5.

Chapter Three: Excavations in Trenches 12 and 13

Wendy Matthews with Pascal Flohr and Salman Xosravi

Objectives and methodology

Trenches 12 and 13 were re-opened in Summer 2013 in order to continue investigation of the Neolithic architecture and diverse contexts and finely stratified deposits at the northern edge of the mound that had commenced in Spring 2013 (R. Matthews *et al.* 2013a). Results from Spring 12 suggested that this area differed significantly from the other areas investigated at Bestansur with regard to, in particular, the:

- presence of extensive well-prepared surfaces, >6 m E-W, of thick silty clay packing with occasional thin plasters, some white, which contrast to the thicker more irregular surfaces and packing in external areas in Trenches 7, 9 and 10, and absence of prepared surfaces in Trench 4 for example for example (W. Matthews *et al.* 2013)
- remarkable longevity and repetition of these surfaces throughout a sequences more than 95cm thick (W. Matthews *et al.* 2013)
- presence of fish, micro-mammals including possibly commensal house mouse, and the smaller size of animal bones in contrast to the larger bone and butchery waste in Trenches 7, 9 and 10 for example that are further from the centre of the mound (Bendrey 2013b)
- greater preservation of charred plant remains, e.g. C1388 (Whitlam 2013)
- midden-like deposits with well-preserved phytoliths (C1485, 1494, W. Matthews 2013)
- well-preserved pigmented fibres (SA1288) and pigmented plaster (C1382)
- abundance of beads (Richardson 2013c)
- coherent discernible pisé architecture in Trench 13 (W. Matthews *et al.* 2013).

Where possible, occupation layers were excavated and sampled separately for wet-sieving and flotation, to study the nature and periodicity of activities in this area of the site and the different ecological and social roles and strategies that they represent. Investigations in this area were productive, as discussed below, but were curtailed in order to focus on the remarkable discovery of a sequence of two well-preserved elaborate buildings in Trench 10, Buildings 5 and 8 (Chapter 2, R. Matthews).

The total area of Trenches 12-13 excavated in Spring and Summer to date covers and area *ca*. 10.4m E-W x 5.5m N-S, in a series of stepped terraces (Figs. 3.1-4). The spatial contexts are discussed in chronological sequences from the earliest to the latest both by trench and across this area, beginning with those in Trench 13, then those in Trench 12.

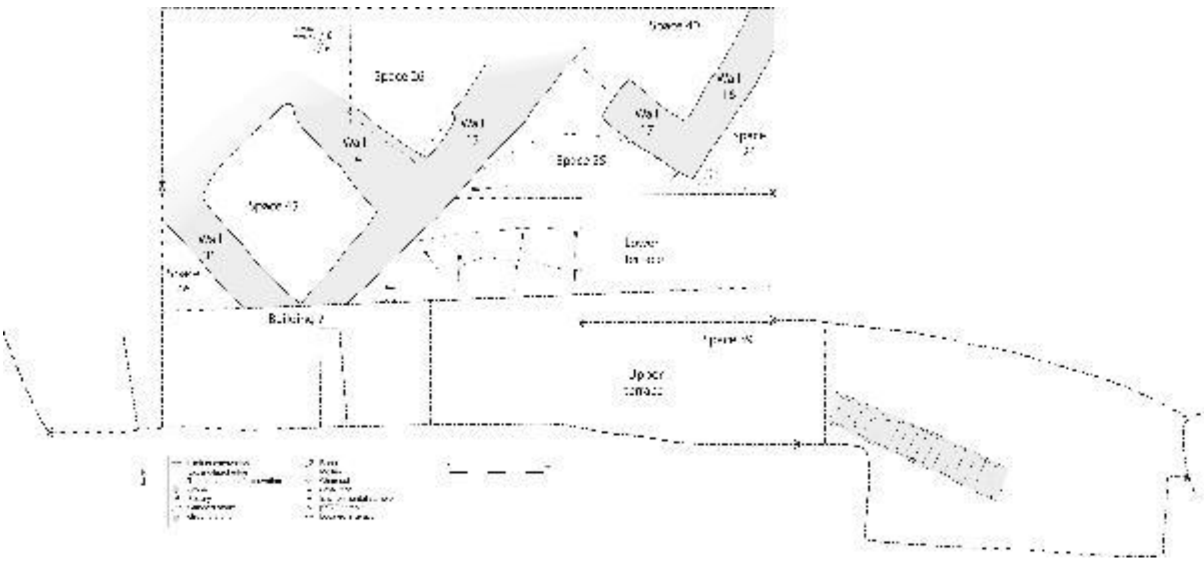

Figure 3.1. Plan of Trenches 12-13 at the end of excavations in Summer 2013.

Figure 3.2. Trenches 12-13 during exaction. Looking south-west.

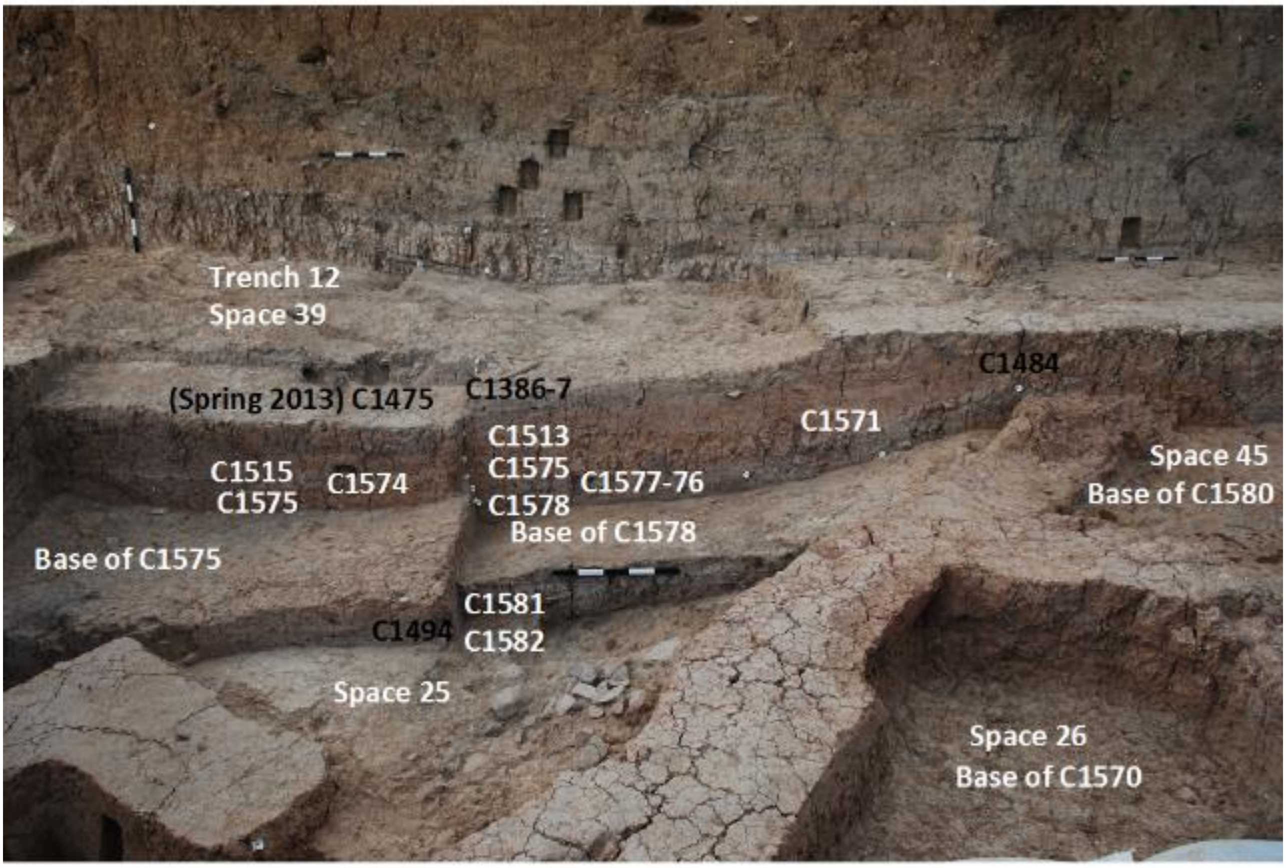

Figure 3.3. Trenches 12-13 excavation contexts and spaces. Looking south. Scales = 50cm.

Trench 13

As discussed above, the aim in Summer 2013 was to investigate the nature and extent of activities in Building 7 and adjacent open areas in this northern area of the mound (Fig. 3.1). To this end Trench 13 was extended 2m to the eastern edge of the field crop. The topsoil and irrigation ditch fill, up to 40cm deep, were excavated as C1572. All spatial contexts in the resulting 6.5 x 3m were excavated (Fig. 3.1-3) and are discussed below.

Building 7

Building 7 was constructed with pisé walls, up to 50 cm thick, made from red silty clay with white calcareous inclusions (Figs. 3.1-4). No plaster surfaces were detected on any of the walls.

Figure 3.4. Building 17, Trench 13. Location of spaces. Looking west. Scales = 50cm.

Within the excavated area, Building 7 comprised four spaces:

- Space 46 was > 1.3m NW-SE. The floors in this room were coated with well-prepared mud plaster floors, c. 1-2cm thick, each of which was covered by lenses of charred deposits, and a final thick layer of greenish ash burnt at high temperatures, *ca*. 5-10 cm thick. This sequence was exposed in the section-profile at the edge of the irrigation channel cut, but not excavated as it is covered by unexcavated deposits in the upper terrace in Trench 12. The floors were sub-sampled as botanical block SA1491, C1584 during straightening of the base of the section-profile.

Figure. 3.5. Trench 13, Building 7, Space 46 and Wall 35. Looking southwest. Scale = 50cm.

- Space 45 is a small interior room, 1.6 x 1.28m. This room did not appear to have a door at floor level. The latest floor was covered by thick mud plaster/packing and grey trampled occupation deposits with fragmented molluscs and scattered lithic and bone fragments, excavated as C1580. The reddish-brown silty clay loam packing that had been used to infill this room was excavated as C1579, and was >20cm thick.

Figure 3.6. Trench 13, Building 7, Space 45, occupation deposits with mollusc fragments C1580. Looking south-west. Scales = 50cm.

- Space 26 is >1.4 x 1.1m in size, to the north-east of Space 45. The surfaces comprise thin discontinuous lenses of grey trample with mollusc fragments. The latest occupation was excavated as C1492 in Spring 2013. Earlier discontinuous occupation lenses also with molluscs fragments and packing was excavated as C1570, *ca.* 20 cm thick, this summer. This room had been truncated by ploughing and irrigation furrows as the field surface slopes down away from the mound to the north in this area. A truncated flexed skeleton at the interface between topsoil and room fill/floors is likely to have been cut from a higher level. This skeleton was only observed at the end of excavation here and was not lifted as it is in a very fragmentary state. Its location and articulation was photographed and planned.
- Space 40 is a small room/entrance-way, 1.3m wide and >1.3 m in length, to the east of Wall 13, and may belong either to Building 7 or an abutting building to the east. This space was excavated to a depth of 40cm, to below the base of Wall 13 as C1569. No well-defined floors were identified, due in part to truncation by ploughing and the slope of the mound. Two obsidian blades had been placed against the southern face of Wall 17 in C1596.
- Traces of an earlier phase of occupation were revealed at the base of C1569, represented by greenish mud bricks/mortar (Fig. 3.7).

External areas adjacent to Building 7

Spaces 25-24 comprise an L-shaped open area, more than 5 x 2.8m, south-east of Building 7 (Figs. 3.1, 3.2, 3.7, 3.8). Initial excavation in Spring 2013 had revealed that these external occupation deposits are comparatively well-preserved, sealed below >*ca*. 40cm of thick packing, and are rich in phytoliths and organic remains (C1479 and C1494). To investigate the extent and periodicity and cyclicity of the activities that generated these organic rich materials in this open area the trench was extended 3x1m south up to the edge of Trench 12, to include the lower terrace partially excavated in Spring 2013, for further sampling and examination during the visit by the palaeoethnobotanist Dr Michael Charles (Chapter 4, W Matthews this volume).

- Space 24, in the north east of this area, was periodically paved by silty clay packing on which there were a succession of sloping surfaces with charred fire-spots. The earliest occupation surfaces and deposits excavated in Summer 2013 comprised grey lenses with charred fire-spots, excavated and sub-sampled as C1521 (Fig. 3.7). A grindstone fragment (SF444) and bone needle/pin (SF318) were amongst the artefacts discarded on this surface C1521. This surface was sealed by silty clay packing up to 20cm thick, excavated as C1521. The charred lens C1479 on top of this packing, exposed in Spring 2013, proved to extend over a large area and was excavated as the base of C1575, with a number of botanical block samples collected with charred material adhering. This lens included a carnelian bead SF328 and traces of red pigmented materials.

Figure. 3.7. Trench 13, Building 17, Space 40 and lower greenish bricks/mortar (C1569, right); External open area, Space 24 and charred fire-spot and occupation deposits (CA1521, left). Looking east. Scale = 50cm.

- Space 25, in the south of this open area, was roughly paved with stones - some of which were discarded grind-stones, including SF368 placed upside down, C1581 (Figs. 3.1-4). Earlier midden-like deposits were evident below these, but not excavated this season. The stone layer was overlain by successive accumulations of midden-like open area deposits, >20-25cm deep, excavated as C1581 and C1582. Unusually these deposits slope down southwards into the mound. These organic rich deposits were covered by silty clay loam packing, C1578, which was up to 10 cm thick in the centre of this area, but lensed out to the west. On top of this packing surface, lenses of occupation deposits, had accumulated in the central west of the trench, in a sequence *ca*. 7-10cm thick. These comprised greenish grey ashy silt loam, 2.5YR 6/2 light brownish grey, with burnt aggregates, phytoliths and organic remains, excavated as C1577, and overlying slightly ashy silty clay loam C1576, at the base of which was a possible clay token, ovoid/almond in shape SF332. These deposits were then sealed by thick silty clay packing, C1575, 2-8cm.

Trench 13: Space 39

The silty clay packing layer C1575 and subsequence deposits overly the walls of Building 7 and were the foundation of the extensive sequence of packing surfaces and occupation lenses excavated more fully in Trench 12 (Figs. 3.2-3). Thin discontinuous occupation deposits had accumulated on the surface of packing C1575 and were excavated as C1575, C1571. These in turn were sealed by another layer of packing, excavated as C1515 in the east of the trench and C1513 in the west, *ca*. 10 cm thick. This packing formed the surface for accumulated occupation deposits C1475, and the pattern for subsequent practices represented by couplets of packing *ca.* 5-7cm thick overlain by occupation deposits ca. 1-3cm thick that accumulated for more than a metre over an area greater than 9 x 3m in this northern area of the site, excavated as Trench 12 and the lower terrace in Trench 13 in Spring 2013 and by Pascal Flohr in Summer 2013, reported below.

Trench 12: Space 39

Excavations in Trench 12 were supervised by Dr Pascal Flohr, in order to investigate the remarkable sequence of finely stratified deposits in this northern area of the site and the early Neolithic ecological and social strategies that they represented, as discussed above in the introduction. The aims were a) to enlarge the area of excavation on the upper terrace commenced in Spring 2013 to include the whole length of the section in sequence from the latest deposits in the east, and b) to excavate the sequence down to that of Trench 13 and the base of this phase of occupation to study the history and periodicity of activities in this area.

An area 4.4 x 1.3m was excavated and cleaned. Successive finely stratified layers were excavated and intensively sampled, all sloping to the northwest (Figs. 3.1-4). These comprised alternating sequences of packing with occasional occupation deposits (C1514, C1522, C1523, C1525 and C1528) and distinctive ash layers and lenses (C1519, C1524, C1526, C1529, C1531). Some of the surfaces and occupation lenses were discontinuous and interbedded.

A rich range of artefacts and bioarchaeological materials were deposited in these layers including: abundant bone, chipped stone and molluscs. Of particular note was the discovery of:

- two clusters of pierced flat stones, many of which were broken in antiquity, C1523 SF321 and C1541 SF317 (Figs. 3.8-9; Chapter 10 Richardson this volume). These have been tentatively interpreted as fishing weights, not least because of the abundance of fish bones in the same and surrounding contexts (Chapters 7 Bendrey and 4 W. Matthews this volume). Interestingly, these were discarded in a very similar location, perhaps suggesting separated by ash, suggesting repetition in activities in this area.
- a marble bracelet, of rare supra-regional significance in C1528 SF336 (Chapter 10 Richardson this volume; Kozlowski and Aurenche 2005).
- and a range of beads, including dentalium beads (Chapter 10 Richardson).

As no walls were identified during excavation of this upper terrace it is uncertain whether these well-prepared surfaces and periodic accumulations of ash, orange organic material molluscs and artefacts were deposited within a large building > 9 x 2.6m. This area is currently interpreted as a repeatedly used open area.

Figure 3.8. Trench 12 cluster of pierced stone objects. C1541 SF317. Scale = 15cm.

Figure 3.9. Trench 12 cluster of priced stone objects. C1523, SF321. Looking south. Scale = 15cm.

Trench 12: Eastern extension

In order to investigate whether there were any walls associated with these finely stratified surfaces and deposits in Trench 12, discussed above, and this is an external or interior area, we excavated a large late cut associated with pottery in the east of the main section, in a trench 4 x 1m, 1.85m deep, supervised by S. Xosravi (Fig. 3.10). We elected to excavate the fill of this cut with the aim of rapidly revealing the nature and extent of Neolithic deposits and features both south into the mound and to the east of Trench 12.

This Post-Neolithic cut proved more extensive than expected, and continued more than one metre into the mound, which rises steeply up at this point. The fill of this cut, however, was successfully excavated entirely down to its base within the trench (C1512, C1518, C1571), to reveal intact compact deposits and a discontinuous wall, *ca.* 40cm wide and > 2m in length, made from mud bricks. This wall was oriented approximately SE/NW, like Neolithic walls exposed across the site, but was not on exactly same alignment as these (Fig. 3.1, Fig. 3.10). The date and extent of this wall, however, could not be excavated as the surfaces and deposits that extended into this area from Trench 12 were stratigraphically earlier than the lowest levels reached this Summer 2013. The bricks are ca. 30 x10 cm in size and very different in size and shape from the much earlier 'boat-shaped' mud bricks in Trench 10 (Fig. 3.1).

Figure 3.10. Trench 12 Eastern Extension to excavate fill of Post-Neolithic cut. Intact Neolithic deposits identified in west of this trench, comprising continuation of finely stratified deposits in Trench 12. Wall at base of cut outlined by the location of photographic scales in the foreground (see also Fig. 3.1). Looking south. Scale = 50cm.

One potential strategy in future excavations might be to excavate a step-trench further into this northern edge of the mound in to define further the character of settlement and community in this area. Deposits in the upper levels of the mound in this area, however, have been bioturbated by root action (Chapters 4 W. Matthews; 8 M. Charles) as well as large burrows visible in the exposed section-profile (Fig. 3.2).

Summary discussion: Trenches 12 and 13.

In Trenches 12-13 the main north-facing section-profile is 12.5m east-west. The total depth of Neolithic occupation deposits investigated and analysed in this area of the site is more than 2m, of which up to 1m is below the level of the modern field. The sequence is summarised in a Harris Matrix (Figs. 3.11-12).

Phasing

Three major phases of Neolithic occupation have been identified in this northern area of the mound to date (Fig. 3.2). The depth of underlying archaeological deposits and natural will be investigated by coring in Spring 2014. The three phases of Neolithic occupation comprise from the earliest:

1. green silty clay mud-brick and mortar architecture, which has only been partially exposed in the north of Trench 13, below Space 40 and C1569.
2. red silty clay pisé architecture with walls 45-50cm high:
    - Building 7 with >3-4 small rooms, Spaces 26, 40, 45 and 46.
    - Open areas with a) surfaces and midden-like deposits, Space 25 >3.04 x 1.8m, and b) activity surfaces with grindstone, charred fire-spots and discarded lithics and sparse bone Space 24, >1.74 x 0.85m in size.
    - The interior and exterior areas had been infilled with thick silty clay packing with occasional discontinuous lenses of grey occupation
3. extensive sequence of surfaces in Space 39 constructed from silty clay packing and occasional white or red mud plaster surfaces/working areas, >9m E-W x 2.3m N-S, c. 1.25m thick. A diverse range of occupation residues, c. 1-3 cm thick, accumulated on these surfaces, particularly in the central area, where underlying midden-deposits in Space 25 had subsided due to compaction and decay. The activities attested include:
    - combustion: in-situ as well as rake-out, perhaps for cooking
    - use/discard of molluscs (Helix salamonica)
    - omnivore coprolites with fish-bone (Chapter *W. Matthews)
    - discard of largely broken probable fish-net weights perhaps from mending nets
    - use/discard of lithics and animal bone
    - loss/discard of personal ornaments (bracelet/beads)
    - use/discard of furnishings including: red pigmented plaster and red ‘fabric’ (Chapter * W Matthews).

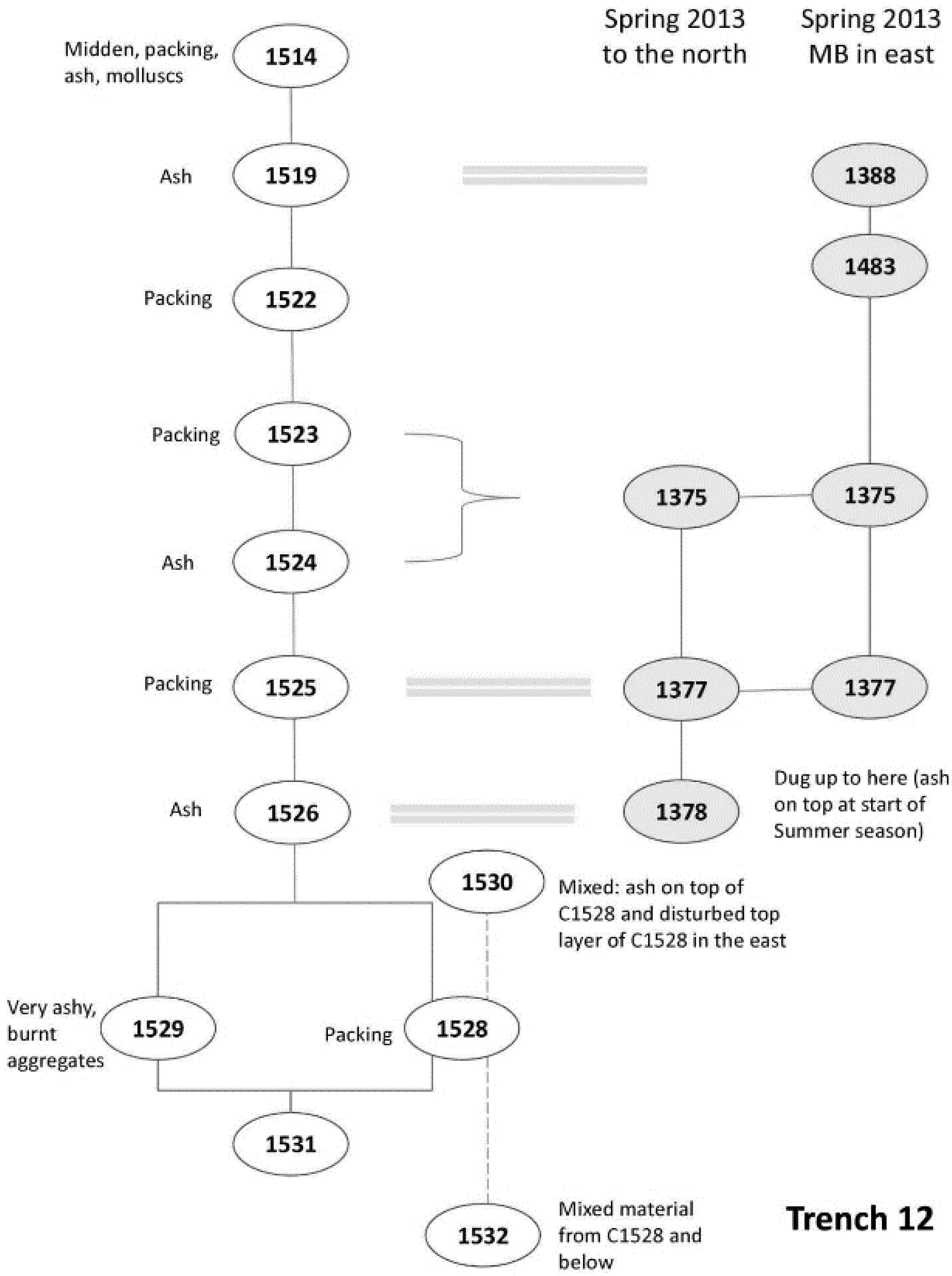

Figure 3.11. Trench 12 Harris Matrix.

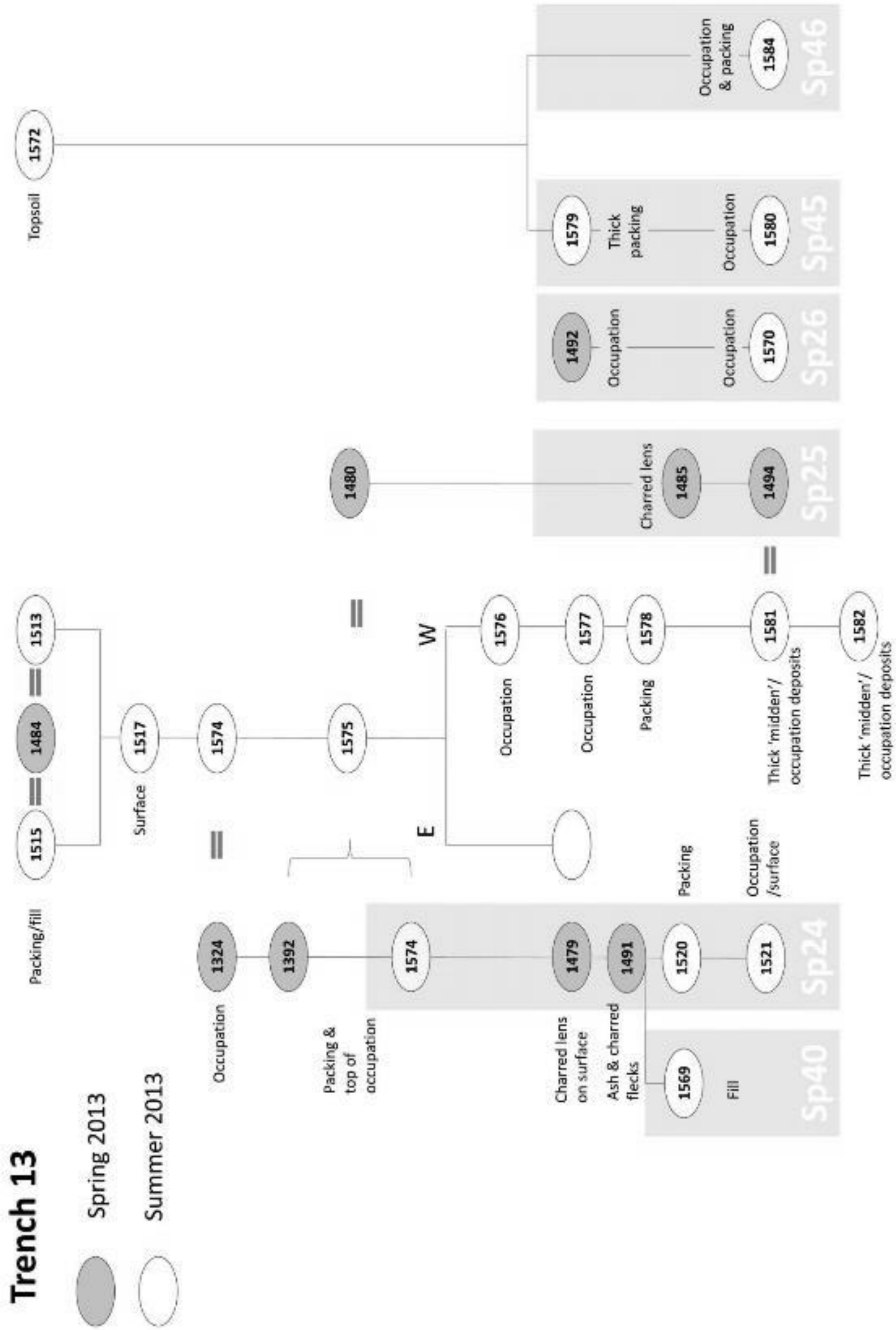

Figure 3.12. Trench 13 Harris Matrix.

Chapter Four: Architecture, Activities and Site Formation Processes: Micro-Contextual Approaches

Wendy Matthews

Introduction

The aim in this chapter is to examine current evidence for past activities, roles and relations at Bestansur, with particular focus on field analysis of architecture and microstratigraphic sequences from Summer 2013, and micromorphological analyses of materials and depositional sequences in large resin-impregnated thin-sections from Spring and Summer 2013. The objectives in this report are:

- to analyse the taphonomy and preservation of materials to examine the fundamental implications of this for interpretation of the presence and significance of particular materials, with particular focus on the plant remains
- to review architectural materials, technology and configurations across the site as indicators of the context and boundaries of particular activities, roles and relations
- to examine the range for activities attested at the site from the microstratigraphic and excavation data and their ecological and social significance.

Methodology: micro-contextual, interdisciplinary and comparative approaches

In the field, section-profiles through microstratigraphic sequences were cleaned, recorded and analysed at the edge of trenches and in temporary and strategic baulks during excavation in order:

- to identify the composition, sequence and topography of deposits at Bestansur, which was highly variable, and
- to enable micromorphological, phytolith and geochemical sampling and analyses.

Micromorphological block samples were collected for high-resolution analysis of microstratigraphic sequences in large resin-impregnated thin-sections, 14 x 7cm, 25-30μm thick to study:

- the origin and pre-depositional history of the diverse sediments, architectural materials, micro-artefacts and bioarchaeological materials in deposits at Bestansur to examine forensic-scale traces of activities
- the type, thickness and frequency of surfaces and impact of activities on these as indicators of the context, periodicity and intensity of activities
- the depositional history of sediments and materials and their contextual associations to examine their significance as indicators of resources, activities and continuity and change in roles and relations
- traces of post-depositional alterations and histories of components to investigate where there may have been significant alterations/loss of components and their contextual associations and significance.

Table 4.1. List of micromorphology samples collected for analysis of architectural materials and traces of activities at Bestansur and Shimshara Summer 2013 by W. Matthews.

Bestansur Summer 2013			
Micromorphological sample No.	**Context No.**	**Trench No.**	**Description**
1499	1519	12	packing and ashy deposits
1500	1526	12	packing and ashy deposits
1501	1665	13	Exterior occupation deposits
1502	1521	13	Exterior occupation deposits and packing
1503	1580	1310	packing and occupation deposits
1635	1609	10	External sloping surfaces
1778	1610/1674	10	Ash in fire-installation
1779	1610/1673	10	ash in fire-installation
1780	1562/1671	10	ash in fire-installation
1781	1562/1669	10	Ash in fire-installation
1782	1562/1668	10	Ash and packing in fire-installation
1788	1548	10	Entrance deposits
1790	1494	13	Ashy deposits
1794	1605/1607	10	Occupation deposits (East of threshold)
1798	1540	10	External surfaces
1799	Not excavated	10	Wall plaster
1800	1625/1727	10	Packing deposits
Shimshara Summer 2013			
Micromorphological sample No.	**Context No.**	**Trench No.**	**Description**
1732	1663	E-W Section	Shimshara ashy surfaces below Trench 2
1733	1660	N-S Section	Early grey and burnt deposits
1734	1660	N-S Section	Early burnt and ashy deposits
1735	1660	N-S Section	Natural and early grey deposits
1736	1660	N-S Section	Early grey deposits
1744	1644	2	Burnt deposits
1745	1655	2	Pebble and other surfaces
1746	1660	N-S Section	Ashy surface below Trench 1
1791	1649	1	Burnt deposits associated with scapula

In summer 2013, a number of block samples were also collected to examine intact palaeobotanical remains, especially charred plant remains, to study their morphology, anatomy and preservation as intact specimens within their depositional context. These blocks were collected from a) intact clods during excavation, ca. 5-10cm in size (often by use of a big pick) and b) intact blocks cut from microstratigraphic field-profiles.

Site formation processes and preservation of components and stratigraphy

The preservation of plant remains, bone and stratigraphic units is clearly better >50cm below the modern surface, where there is less evidence of bioturbation. The internal structure of bone is better preserved and there is little or no evidence of replacement of collagen by secondary mineral formation (Fig. 4.1).

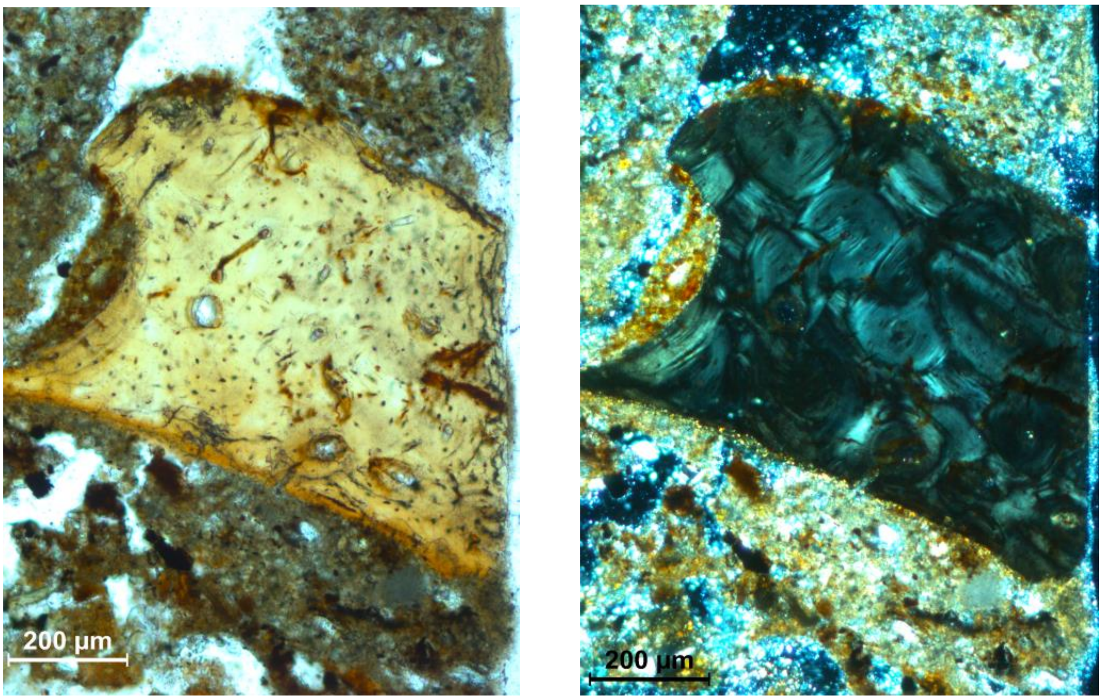

Figure 4.1. Enhanced preservation of bone >50cm below modern surface. SA1502, C1521, Space 24, Trench 13. (PPL, XPL).

It is increasingly evident that although charred plant remains are also better preserved at depths >50cm below the surface, the comparative sparsity of charred plant remains recovered by flotation in many contexts above and below this depth is due to a number of factors that micromorphology can contribute to in integrated archaeobotanical research.

- The predominant plant part identified in thin-section is of reed/grass/cereal stem/leaf epidermises, whether as charred plant remains (Fig. 4.8 below) or as phytoliths (Fig.

4.2). These stem/leaf parts are highly combustible and in controlled experiment are the first parts from which carbon is combusted at temperatures as low as 350-400°C (Boardman and Jones 1990). This abundance of reeds/grasses at Bestansur is similar to that observed at other late 9th/early 8th millennium BC Neolithic sites such as Boncuklu, central Turkey (Baird pers. comm.; W. Matthews n.d.). Reeds and grasses are likely to have been abundant, as today, if the current major spring was in a similar locale, and were certainly selected as the principal source of fuel in a large oven excavated and sampled in Building 5, Space 48 (Fig. 4.2). Here <5% of the plant remains are preserved as charred remains, most are preserved as articulated phytoliths or as melted silica or white calcitic ashes, suggesting temperatures >850 °C (Canti 2003).

- The abundance of charred seeds and wood at Bestansur in thin-section is lower than at other sites, such as Çatalhöyük, Turkey. This sparsity is not due principally to bioturbation as bioturbated areas can be readily identified, represent <20% of deposits, and do not contain abundant charred remains. Seeds and wood tend to preserve longer as charred remains during combustion (Boardman and Jones 1990), and are therefore more likely to be preserved as charred plant remains than stems and leaves and to proportionately raise overall estimates of the abundance of plants in samples recovered by water-flotation.
- Dung was also used burnt as fuel at Bestansur, often at high temperatures, leaving little residual carbon, but more abundant disarticulated phytoliths and some ash, as illustrated in previous archive reports.
- Nut pericarps have been identified in thin-section as fragile calcitic ash in deposits from Shimshara (Fig. 4.3, SA1744, C1644, Trench 2) as at Sheikh-e Abad and Jani, which would also not survive water flotation.
- There is evidence of exceptional preservation of plant remains: a) at Bestansur as white phytolith traces of matting and as partially mineralised plant remains e.g. on a floor surface in the entrance to Building 8, Space 54 (Fig. 4.4), and b) at Shimshara in early grey silty clay deposits, where plants must have been rapidly buried to prevent oxidation and subsequent microbial activity (Fig. 4.4).
- Traces, speculatively, of a fibrous 'felted' material have been identified in a thin-section from Trench 12/13 C1378, SA1288, as a crude 'outline' by a red mineral pigment with which it had probably been coloured (Fig. 4.5; W. Matthews 2013 Spring Archive Report).
- A further factor in the sparsity of charred plant remains within buildings and some open areas may have been the use of mats, suggested not only by traces of matting, but also by possible impressions on surfaces in thin section, such as those in Figure 4.7-8.

All of these plant and organic remains and their micro-contextual associations are currently being quantified and identified.

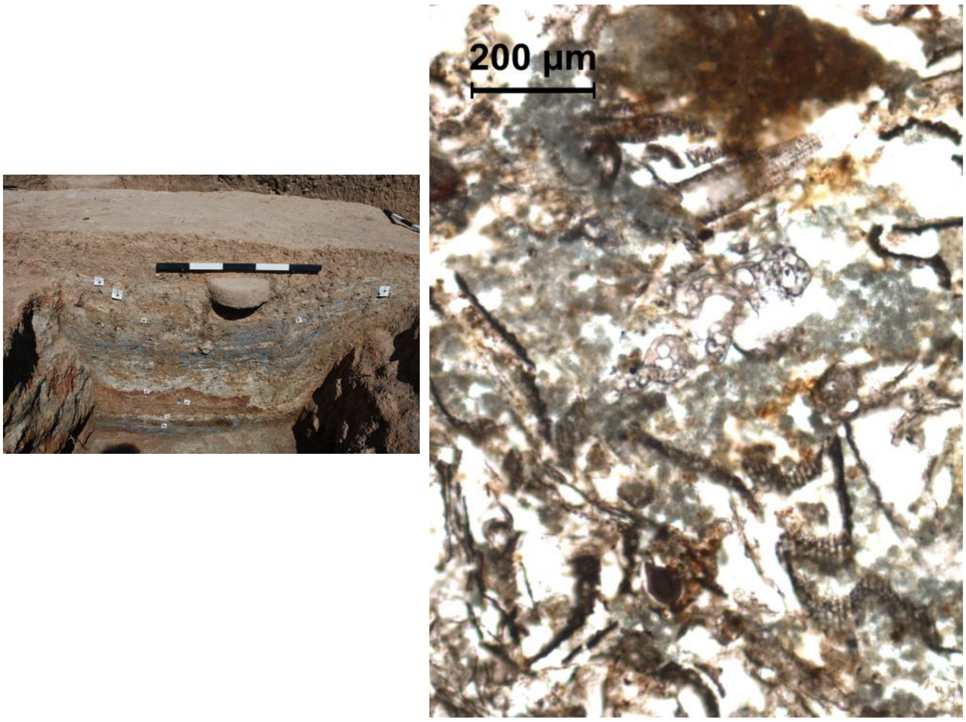

Figure 4.2. Well preserved articulated phytoliths (with little residual carbon), melted silica and calcitic ashes (PPL). Building 5, oven, Space 48. Field scale = 50cm.

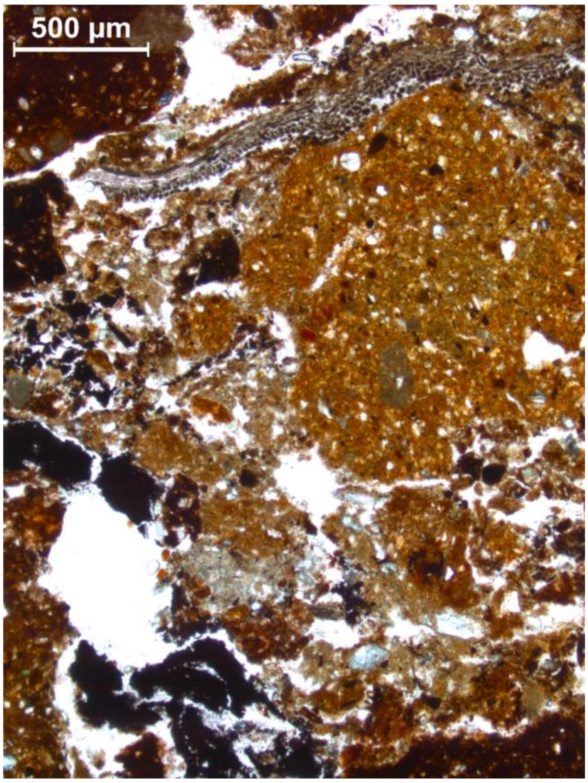

Figure 4.3. Nut pericarp preserved as calcitic ash (top), Shimshara, SA1744, C1644, Trench 2. PPL.

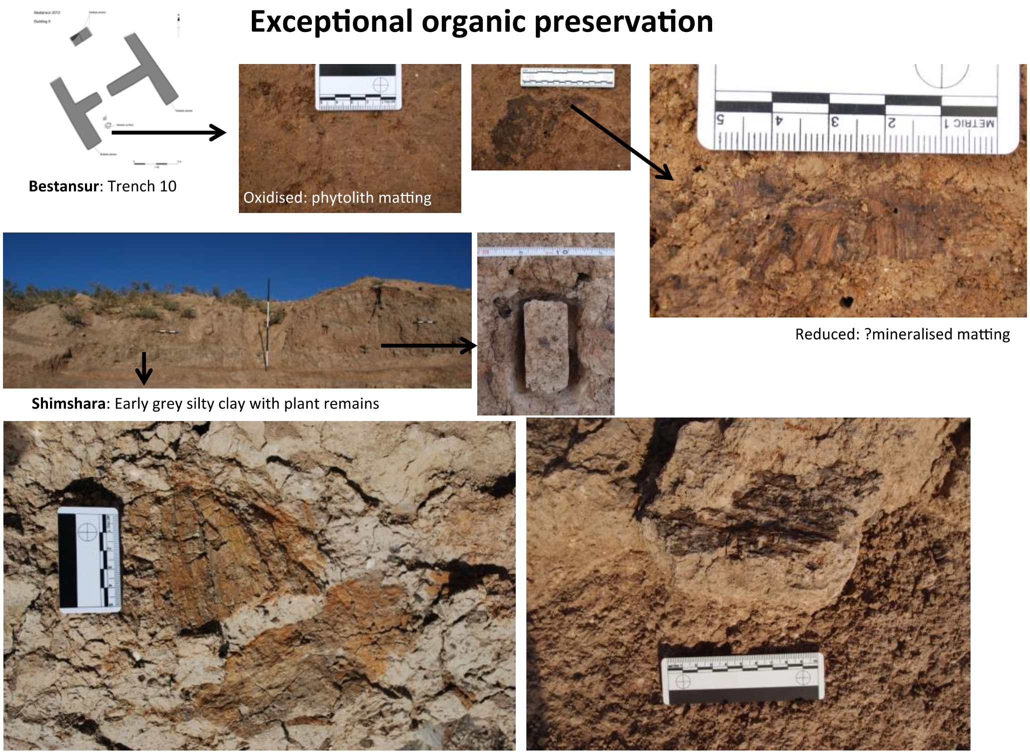

Figure 4.4. Excellent preservation of plant remains at a) Bestansur (top): phytolith and mineralised traces of matting; and b) at Shimshara: mineralised plant remains in early grey silty clay levels at the base of the mound.

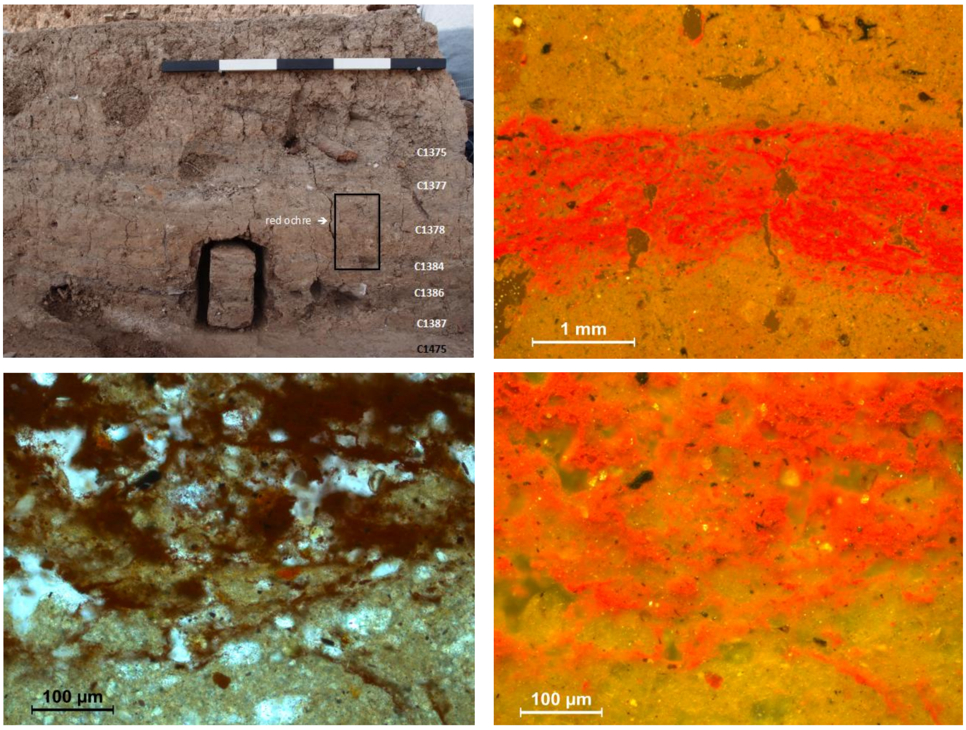

Figure 4.5. Possible traces of a fibrous material outlined in residual red mineral pigment. Trench 12/13 C1378, SA1288. Field photo (scale = 50cm), PPL (lower left) and oblique incident light (right).

Architecture

A ^{14}C date from the latest levels abutting/overlying Building, suggests that the architecture in Trench 10 discussed here pre-dates *ca.* 7,700 cal BC.

- The earliest architecture excavated to date comprises a large building, Building 8, partially exposed in plan (Fig. 4.6). In contrast to the later pisé walls constructed from red-silty clay with carbonate inclusions, the walls of this early architecture were built of dark greyish brown silty clay 'boat-shaped' mud-bricks set in a yellowish brown silty clay-silty clay loam mortar. The walls were plastered with multiple layers of 'mud' plaster: reddish-brown, greenish-brown and white in colour with traces of red pigment, probably from paint (Fig. 4.6).
- The stubs of these mudbrick walls were incorporated into the base of some of the walls for a later pisé building, Building 5, of similar but not identical plan, suggesting that these two very different architectural technologies were not separated by a considerable span of time.
- The inter-bedded use of reddish-brown mortar, macroscopically similar to the later pisé material, in some sections of the earlier mud-brick walls attests a period of innovation and experimentation in the use of building materials during these early phases of sedentism, as observed by Smith (1990) in buildings at Ganj Dareh, from *ca*. 7,900 cal BC in the higher Zagros, to the south-east.
- This change in the type and source of sediments used for architectural construction is currently being analysed to investigate whether and how it may relate to environmental, technological and social changes by study of the properties, structure and source of these sediments. Possible considerations in this choice to change source materials include:
    - alterations in land-use, perhaps suggesting that the early dark-greyish brown sediments and/or the land that they derive from were more valued for non-constructional purposes in later levels – e.g. speculatively for agriculture - than the subsequent reddish-brown silty clay with carbonate inclusions
    - access to sources/land
    - greater demand for mud building materials and architecture and more rapid construction in rammed earth (pisé) than in thin laid mud-bricks and mortar, for which the reddish-brown silty clay with carbonate inclusions may have been more suited, perhaps associated with an increase in settlement size.
- All red-pisé architecture across the settlement at Bestansur is on a very similar SE-NW alignment, perhaps suggesting community wide planning and settlement expansion or functional and symbolic rationales (e.g. heat, light, cosmology, social and ritual practice), similar to those discussed by Shepperson (2009) for later architecture.

In thin-section the mud plaster on the north-western face of the north-westernmost exposed wall of Building 8, comprises multiple applications of >13 plasters/washes, <0.5-5mm thick, from different sources, including multiple thin-coatings of white silty clay, similar to those applied to the walls of Çatalhöyük, >*ca*. 700 years later (Fig. 4.6; Matthews 2005). These multiple layers of white-wash are the latest in the sequence of wall plasters and cover traces of earlier red pigment, which may perhaps be from a painting, as the application of pigment was discontinuous (Fig. 4.6), and will be investigated during forthcoming excavations in the next season [for the results of this analysis, see Godleman *et al.* 2016].

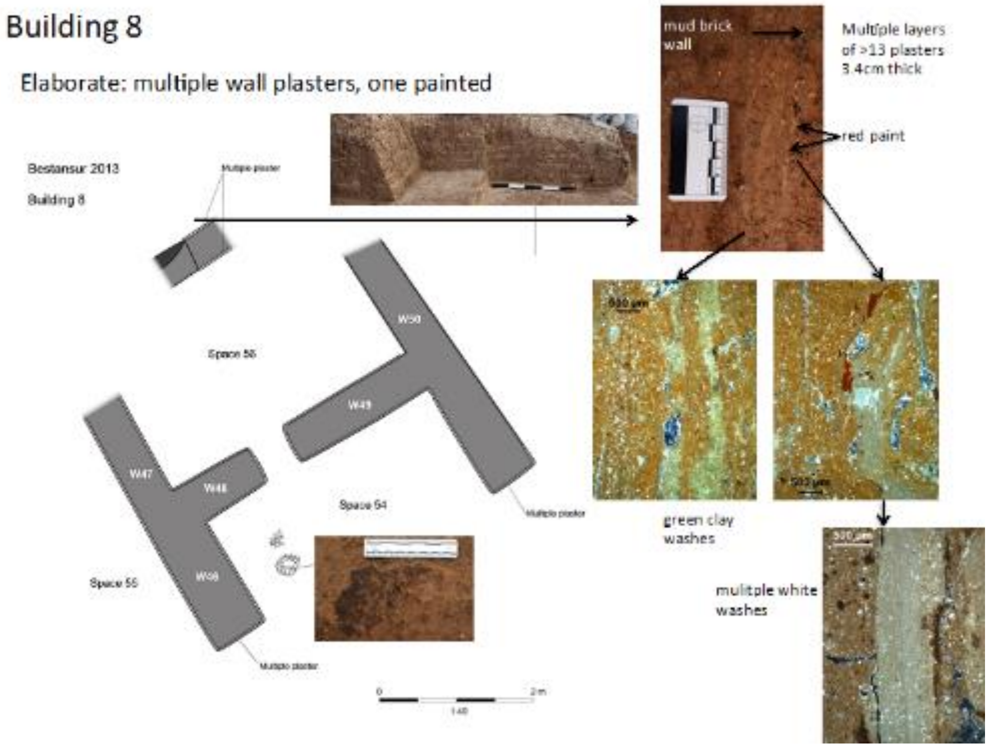

Figure 4.6. Building 8 walls and multiple layers of multi-coloured plaster, one painted.

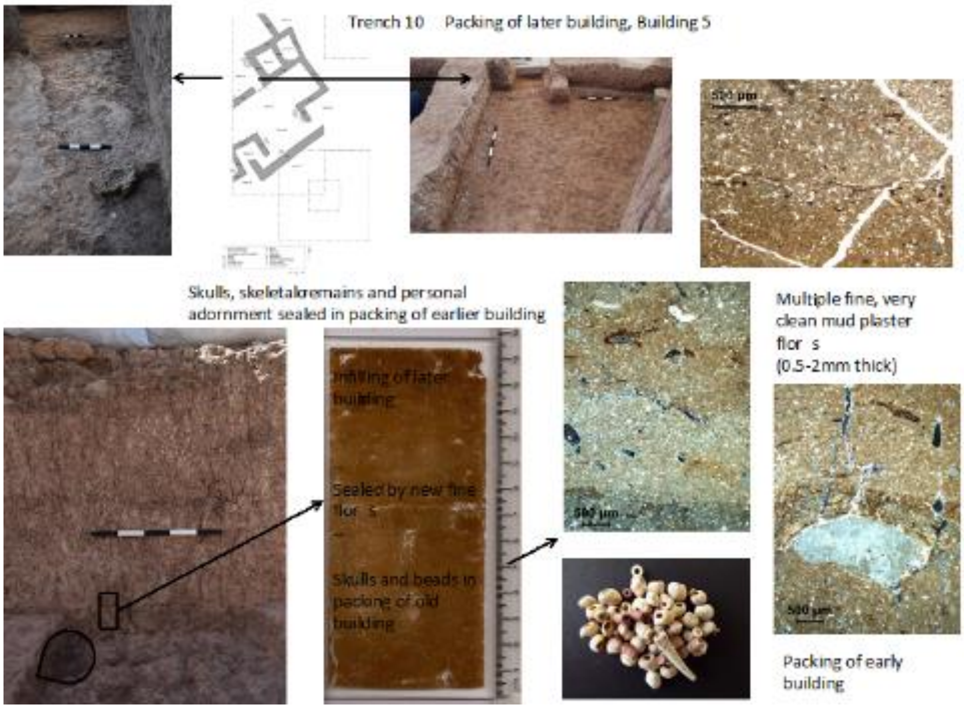

Figure 4.7. Packing and floor plasters in Space 50 where skulls, skeletal remains and beads were placed in packing between Buildings 8 and 5.

The floors in Space 50 where skulls and skeletal remains were placed in packing between the earlier mud-brick building, Building 8, and later red-pisé building, Building 5, were also coated with multiple layers of silty clay mud-plaster and kept remarkably clean (Fig. 4.7). The sparsity of dust on many floor surfaces and possible mat impressions in thin-section suggest that they may have been covered with mats/skins.

Traces of activities

A wide range of microarchaeological residues as well as plant, bone and dung remains are being identified in thin-sections of deposits from Bestansur and Shimshara. These include of note: molluscs with well-defined seasonal banding, associated with omnivore coprolites, fish bone and charred plant epidermises in open area/midden-like deposits C1665, Space 25, Trench 13 , SA1501 (Fig. 4.8a); and burnt aggregates and chipped stone flakes in deposits rich in calcitic plant ash in open area deposits, C1540, in Space 27, Trench 10, SA 1798 (Fig. 4.8b).

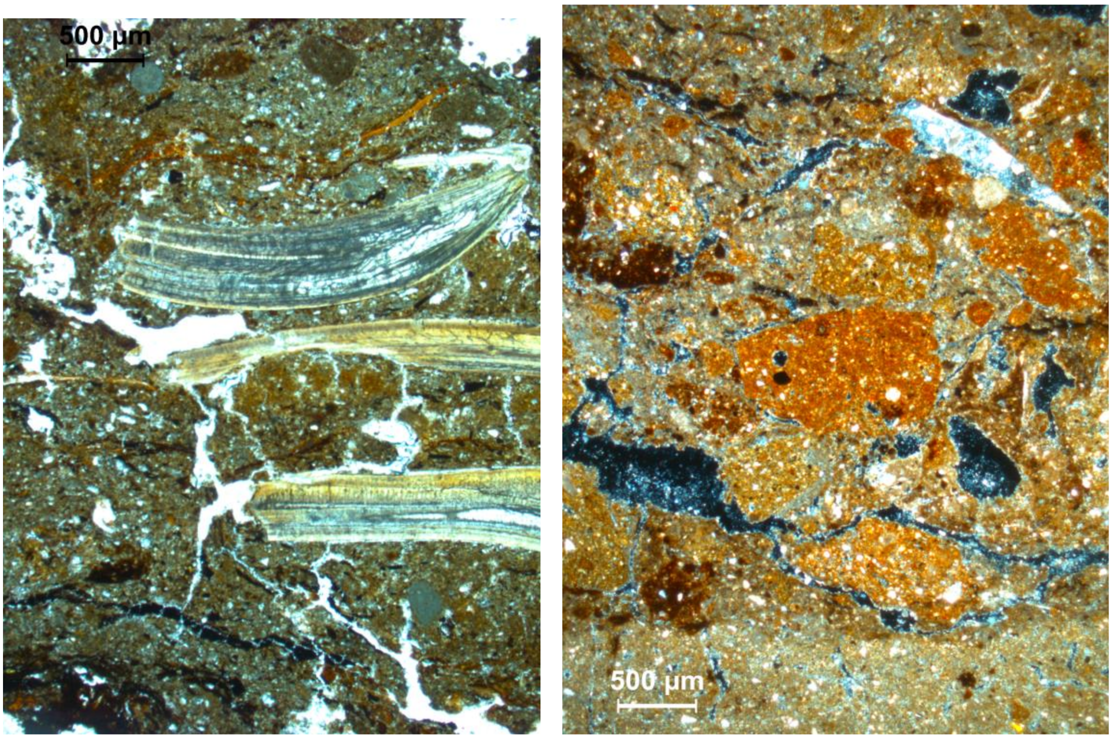

Figure 4.8. a) Left: Open area deposits rich in molluscs, fish bone, omnivore coprolites and charred plant epidermises, SA1501, C1665, Space 25, Trench 13 (PPL). b) Right: open area surface with possible mat impressions and thick ashy deposits with burnt aggregates, sparse articulated charred plant epidermises and a chipped stone flake SA 1798, C1540, Space 27, Trench 10.

Conclusions

A diverse range of surfaces and accumulated occupation deposits characteristic of interior and exterior activities at Bestansur and Shimshara is currently being identified. These signatures are being linked with other specialist data in this report to provide a more holistic account of Neolithic resource management and sedentism in different ecological niches on a transect across the central Zagros.

Chapter Five: Excavations at Shimshara

Wendy Matthews, Roger Matthews, Kamal Rouf Aziz and Pascal Flohr, with Matt Bosomworth, Tom Moore, Salman Xosravi and Agnieszka Trambowicz.

Introduction

Rationale for investigation

The Neolithic site of Shimshara was selected for excavation as it is known to have Neolithic Levels from Mortensen's (1970) excavations in 1957. It is located in the Rania Plain, Sulaimaniyah Province, the second most fertile plain in Iraqi Kurdistan, after the Shahrizor Plain. The site therefore provides an important comparison to Bestansur on the Shahrizor Plain, for investigation of local and regional variation in Neolithic ecological and social strategies, a key aim of the Central Zagros Archaeological Project. Bestansur is close to a major perennial spring, while Shimshara is on the banks of a major river, the Lesser Zab.

The assessment and section cleaning in Summer 2012 had established that there are at least2.5m of extant Neolithic deposits at Shimshara, above natural. A ^{14}C date on charred plant remains from the base of excavations revealed an age estimation of 7450-7080 cal. BC, at 2 sigma (95% probability), on one of a cluster of charred nutshells (Beta Analytic). Field, micromorphological, zooarchaeological and archaeobotanical research had all established that deposits and materials are comparatively well-preserved and have not been adversely affected by periodic submersion by dam waters.

Analysis of the site deposits, contours and topographic survey in Summer 2012, however, highlighted that the site is at risk from further erosion by dam waters, as although it is located on a conglomerate outcrop, the site itself is founded on several metres of unconsolidated silty clays (W. Matthews *et al.* 2012). Indeed dam waters had risen dramatically within the last year due to high precipitation in Winter 2012, and the site had become an island until late Summer 2012. The high-water level had lapped up to the very base of the earliest Neolithic levels, leaving a high-tide mark, but fortunately had not eroded these. Elsewhere, however, on the lower mound at Shimshara, there had been extensive damage and loss of archaeological strata due to the high-level and erosive channel flow and wave-action of the lake. This damage and the exposed palatial buildings of the second millennium BC were extensively recorded by the team, directed by Dr Jesper Eidem, Netherlands Institute for the Near East.

The aims and objectives of CZAP in Summer 2013 were:

- to record and analyse the nature and extent of Neolithic activities along the exposed eastern edge of the mound before further loss by erosion by documenting, sampling and analysing the stratigraphy and materials in the long N-S section-profile

- to investigate the range of Neolithic activities and ecological and socio-cultural strategies at Shimshara by excavation, sampling and analysis of two accessible areas adjacent to the main-profile:

- Trench 1, west of the N-S section profile at 10-15m north of the southernmost datum point, in order to investigate visible traces of Neolithic occupation in a comparatively flat area of the mound, adjacent to where burnt surfaces were visible in the section-profile.
- Trench 2, north of the W-E section profile, 1.5m east of the westernmost datum for this profile in order to investigate a well-preserved sequence of stratified surfaces and occupation deposits, including a white plaster floor that in thin-section was made from re-worked aggregates of multiple layers of wall plaster, almost identical to the elaborate wall-plasters from Çatalhöyük (W. Matthews 2013).

Figure 5.1. High dam water levels in September 2013.

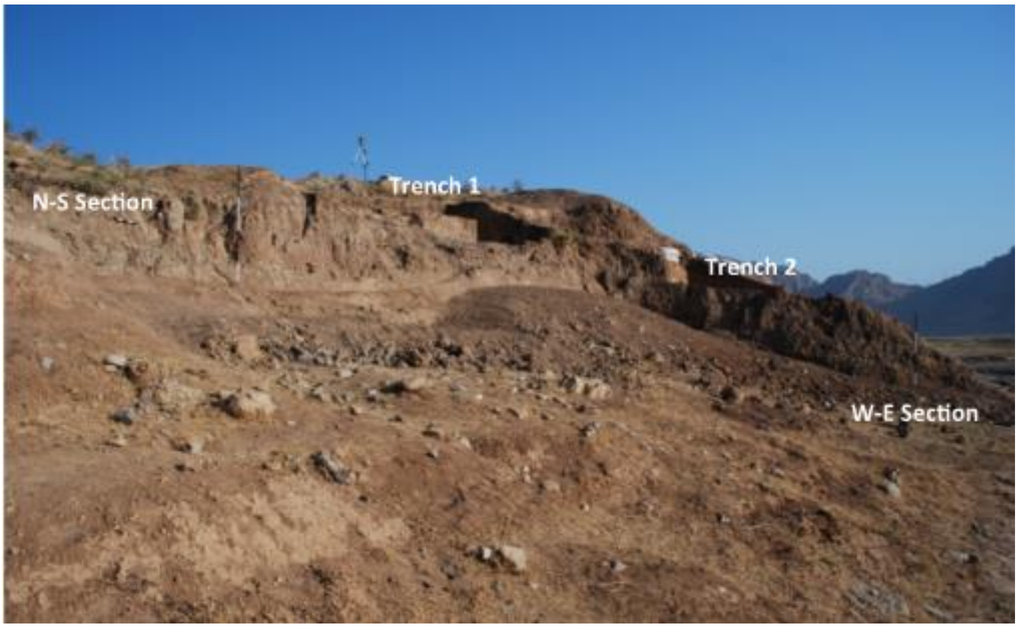

Figure 5.2. N-S and W-E Section profiles and Trenches 1 and 2 at the end of excavation. Looking north. Scale = 2m.

Methodology

Excavations and sampling were conducted from 13-19th August 2013.

N-S Section Profile

We cleaned photographed and drew a further 11m of the main section to assess the nature and depth of extant occupation, with the supervision and skills of A. Trambowicz and S. Xosravi (Fig. 5.1). This extended the record of the long N-S section from >6m from Summer 2012 to 17m at the end of Summer 2013. Further detail was also added to the 8.5m W-E section recorded in Summer 2012.

An entire sequence through 1.5m of deposits at the southern end of the section was excavated in a 0.5 x 0.3m test trench and sampled as C1660 SA1739-42 for wet-sieving, flotation as well as for geochemical and phytolith analysis, at 5m north of the southernmost datum point.

Artefacts, bone and charred wood specimens were collected and labelled separately from the entire length of the section and their location plotted onto the section-drawings. Micromorphological samples of key deposits and boundaries were also collected from along this section, and botanical blocks collected of key specimens for microscopic analysis.

Excavation

Excavation of Trenches 1 and 2 required major stabilisation and terracing of the mound surface to enable safe access and working, due to the steep slope of the mound. The spoil from excavated deposits was deposited at the base of both the N-S and E-W sections to protect the base of the mound from further erosion and to provide further stepped terraces for access and safety whilst working.

Trenches 1 and 2 were excavated and sampled using the full recording and analytical strategy applied at Bestansur. This included:

- On-site dry-sieving
- Collection of samples for wet-sieving and flotation that were transported and processed in the field laboratories at Bestansur, as well as for micromorphological, geochemical and phytolith analysis.

Bulk Finds were recorded in the field lab close to Shimshara, in the village of Bozkin.

Analysis of N-S Field section-profile

The N-S field section predominantly comprised horizontal bands of extant accumulated deposits up to 1.75m deep (Fig. 5.3).

Figure 5.3. N-S section-profile, southern end, 1-8m north from southern datum point. Looking west. Scales = 2m and 50cm.

The principal characteristics of this sequence are summarised from the earliest to the latest deposits.

- The lowermost deposits comprise natural reddish brown silty clay, the same as that encountered in Summer 2012 further to the north.
- The earliest anthropogenic deposits comprise bands of grey silty clay, *ca.* 30cm thick, that had accumulated on the lower slopes of the underlying natural mound at 1-10m north from the southern datum point. These deposits included exceptionally well-preserved mineralised plant remains that suggest these deposits may have formed in a comparatively wet environment and been rapidly buried by fine-grained sediments to prevent rapid oxidation and microbial activity. Micromorphological and botanical blocks were collected to examine further these deposits and plant remains.
- Overlying deposits comprise successive bands of discard in an open area/midden, in a sequence >1.25m thick. Analysis of the 3-D topography of deposits in small gully sections, perpendicular to the main section profile, revealed that although these banded deposits followed the horizontal/slightly sloping N-S contours of the mound, they sloped quite

steeply up to the west, suggesting that they had been discarded from higher levels towards the centre of the mound to the west. This was confirmed by excavation of this slope in Trench 1, e.g. C1661, as discussed below. These banded deposits included burnt aggregates and occasional large chunks of charred wood, sampled for dendrochronology and wood identification.

- At the northern end of the long-section, re-analysis of the deposits below and between Trenches 1 and 2 revealed:
    - a well-preserved floor with burnt plants, phytoliths and bone ca. 10cm below levels of excavation in the north-east of Trench 1 associated with a possible wall at 15.5m north from the southern datum point
    - a probable wall associated with the pebble and stone floor sequences at the southern edge of Trench 2, C1651.

Excavations

Trench 1
Trench 1 was 5 x 4m in size and encompassed flat horizontal deposits in the west of the trench and a break of slope in the east that sloped down to the connect with deposits observed and recorded in the main section. Excavations here were supervised by M. Bosomworth and T. Moore and are summarised from the earliest to latest levels below.

- The lowermost excavated deposits comprise discarded burnt midden-like/open area deposits, C1661, that were the same as and joined up with deposits in the main N-S section (Fig. 5.4).
- These deposits were overlain by a) thick packing/fill C1653, then b) a surface with areas of in-situ burning and discarded rake-out, excavated as C1649. These occupation deposits included discarded animal bone one of which was a scapula.
- The overlying packing/fill was also thick but was eroded in the east and excavated as mixed deposit C1634 below topsoil C1632.
- It is possible that the large stones in C1653 may have been eroded from a nearby wall.
- In the western half of the trench the latest excavated deposits comprise a stone cobbled surface C1645, adjacent to a clay-lined fire-installation. This occupation layer may have been burnt as it is overlain by an extensive grey layer with ash, excavated as C1643, below topsoil C1634, C1632.

The Harris matrix for this trench is illustrated in Fig. 5.7.

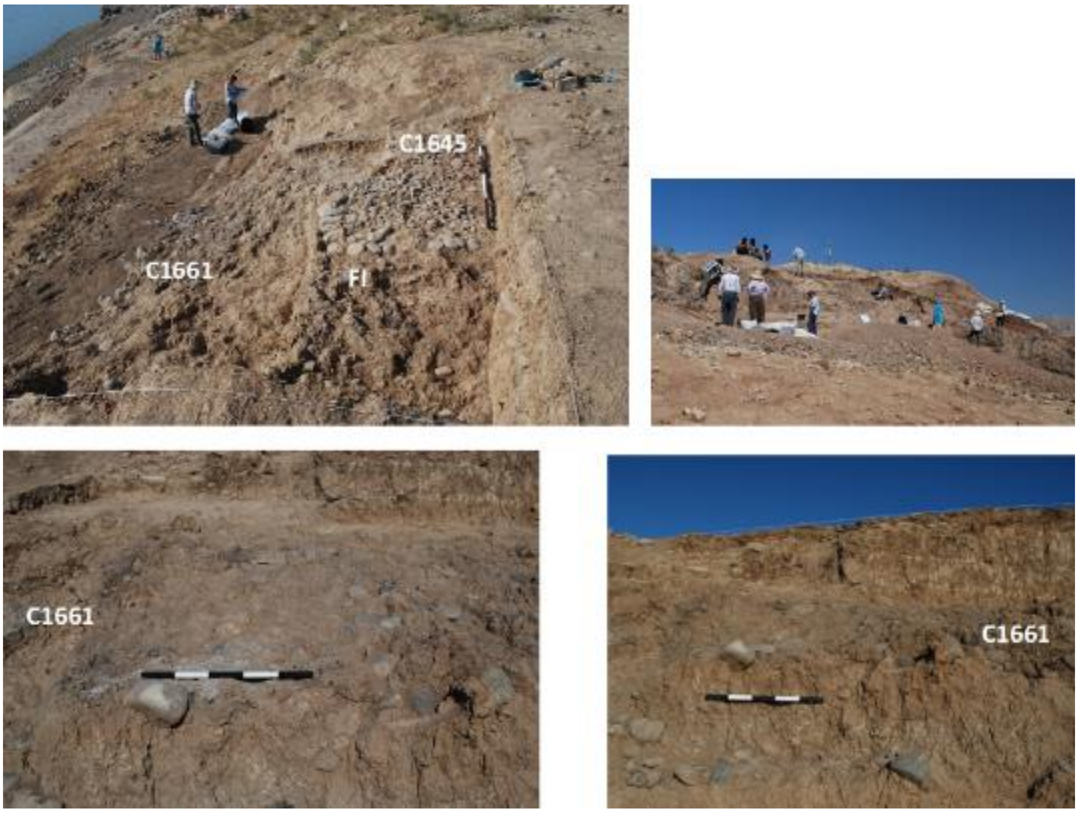

Figure 5.4. Trench 1, lowermost contexts. Scales = 2m and 50cm.

Figure 5.5. Trench 1, upper contexts. Scales = 2m (upper), 50cm (left) and 20cm (right).

Trench 2

Trench 2 was 2.4m (N-S) x >3m (W-E). Excavations were supervised by Pascal Flohr and Roger Matthews. The sequence of deposits excavated are summarised below from the earliest to the latest (Fig. 3.6).

- The lowermost levels excavated in Summer 2013 were of a series of small pebble and stone surfaces mixed with occupation residues. These were excavated as C1652 (fewer stones), C1654, C1655, C1656, C1659 and C1662 (with whitish ash). A number of broken marble bracelet fragments (e.g. SF426 C1652, SF434 C1662) and an incised stone bowl fragment (SF431 C1659) were present in these occupation deposits (Chapter 10, Richardson this volume).

- These deposits were covered by a thick layer of burnt sediments and aggregates, C1639.

- The next phase of occupation was represented by a layer of dark grey in-situ burning and a cluster of animal bone, C1647 (Chapter 7, Bendrey this volume), overlain by higher temperature more oxidised ash C1644. Overlying deposits are also burnt, but more heterogeneous, perhaps from burnt levelling, C1638.

Due to the time required for terracing and the richness of deposits, the white plaster floor was not excavated this season, but lies only *ca.* 7-10cm below the limit of excavation in Trench 2.

The Harris matrix for this trench is illustrated in Fig. 5.8.

Figure 5.6. Trench 2 contexts.

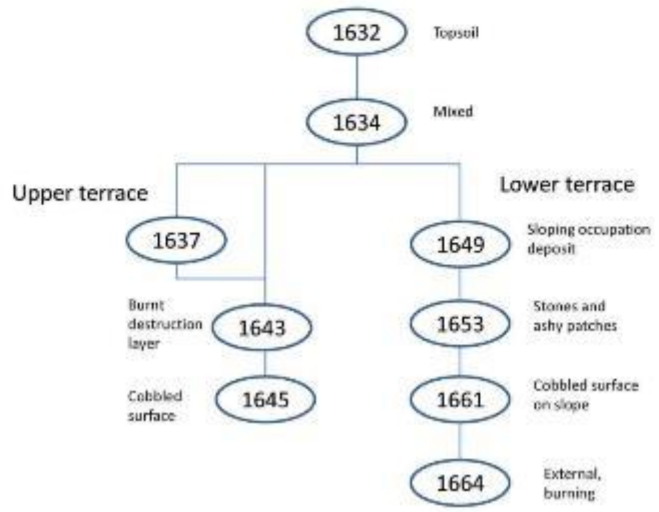

Figure 5.7. Harris Matrix for Trench 1.

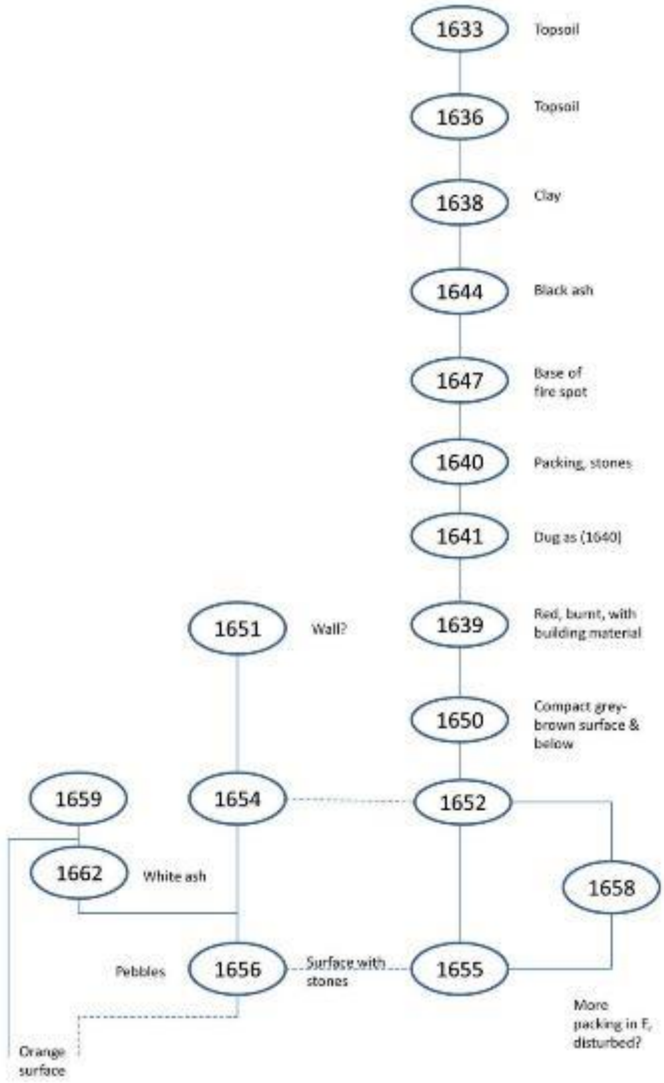

Figure 5.8. Harris Matrix for Trench 2.

Conclusions

A total area 17m north-south and 8.5m west-east was investigated at Shimshara in Summers 2012 and 2013 by: recording and analysis of extant section-profiles; excavation of two strategic trenches, Trenches 1-2; and sampling and analysis of materials from a diverse range of contexts and deposits.

An important discovery this year, was the identification of early grey silty clay deposits with well-preserved plant remains that represents the earliest activities in this area of the site, in the southern section of the N-S section-profile.

In the Neolithic period, occupation and activities in the area of west of Trench 1 were conducted within a flat working area at the edge of a break in slope, east of which deposits were discarded including burnt stones, aggregates and bone. In the area of Trench 2, the earliest excavated deposits represent diverse activities on a series of small pebble and stone surfaces associated with a range of residual artefact fragments including a number of carved marble bracelet fragments and an incised stone bowl fragment. Later activities in the area of Trench 2 are associated with an important cluster of bone, C1647 and burning.

In future investigations it would be particularly profitable to extend excavations to the west of Trench 1 to enable large-scale area excavation as the mound surface is comparatively flat here at this point.

Given high dam water levels, and the destruction wrought by these on the lower later mound, Shimshara remains an important site that is at major risk.

Chapter Six: Microarchaeology

Ingrid Iversen

Introduction: research aims and objectives

The aim of this research is to understand the social and economic relationships of an early Neolithic settlement. It examines the 'role' of early households ('domestic' groups) and is based on the premise that the household represents a 'great intensity of social relations, practices, choices and decisions' making it the ideal place to address questions relating to economic and social networks at a range of scales (Souvatzi 2008, 2). In the Neolithic, the house became central to the organisation of economic and social life as the location of production shifted to the household with implications for greater specialisation and a division of labour. This would have shaped social relationships, within the house and the community as a whole.

A number of methods will be employed in examining, measuring and analysing social space using artefacts and architecture. Analysis of artefacts, their variability and distribution can assist in determining activities and the use of different spaces (Allison 1999). Understanding how activities were distributed is a key line of enquiry and can be used to answer questions about practices and social relationships as well as about the economic functions of households. The spatial data will be analysed at a range of scales, from small areas within an excavated context to the variation seen across the whole site.

Research context and rationale: microarchaeological techniques
The examination of micro-artefacts promises to produce the most reliable picture of past activities as they are more likely to represent 'primary' deposits, having been trampled into floor surfaces or swept into corners during cleaning. Larger artefacts will often have been subject to different site formation processes (e.g. discarded, scavenged or curated) and thus are frequently found away from the area of primary use; at best they can only reflect the immediate pre-abandonment situation (LaMotta and Schiffer 1999; Rainville 2005). The artefacts to be collected and analysed will be those less than 1cm but larger than 1mm in size and will include pottery, bone, molluscs, chipped stone and beads. Some of these are rarely picked up by traditional excavation methods and the 'abundance' of material and the patterns of distribution can also vary from those shown by macroartefacts.

For a more detailed discussion of the theoretical context and approach being adopted see Summer 2012 and Spring 2013 reports (Iversen 2013a; Iversen 2013b).

Methodology: microarchaeological techniques

Sampling strategy
Sampling is based on a scheme of systematic *standard* sampling and *strategic* sampling. It is a collaborative process with discussions between excavators and other specialists determining the outcome, and is fully integrated with the flotation procedures. At least one 50 litre whole-earth **standard sample** (also defined as random or systematic samples) is collected from each context. In

addition any number of **strategic samples** (often referred to as *purposive* samples e.g. Orton 2000) and are samples chosen by the excavator and/or other involved persons (archaeobotanist, microarchaeologist) based on archaeological criteria and with a clear purpose in mind. These samples are not representative of a wider scale or population.

The strategic sampling falls into three categories; one for the purpose of distinguishing **spatial** variation in microdebris (and thus potentially the use of space), one to examine microdebris in and around **features** and finally samples taken for **archaeobotanical** analysis**.** The reasons for sampling are not mutually exclusive and may at times be of relevance to a number of criteria. The data presented in Fig. 6.1 are based on using the primary reason for sampling as indicated by the excavators.

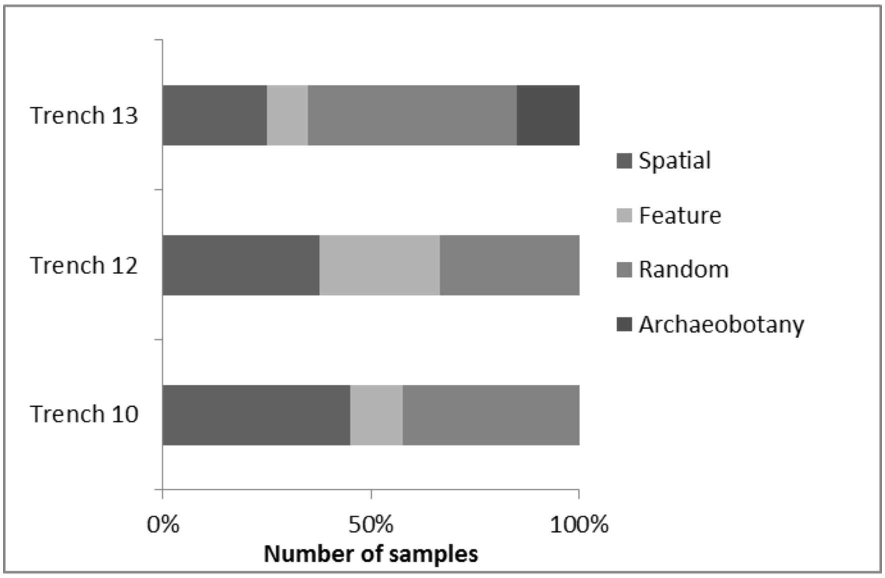

Figure 6.1. Sampling rationale: by number of samples

Spatial sampling has been used at Bestansur where multiple samples have been taken over a whole context and the results are compared to look for any variation across the space in question. The purpose of sampling of **features** can be aimed at examining the use to which the feature may have been put (e.g. small samples have been collected around and under groundstones) or an understanding of possible activities in the vicinity (e.g. thresholds). The microartefactual results of samples taken from features such as walls and fire installations are important in understanding background noise as well as building practices. Burials are sampled in order to ensure the collection of all related artefacts (e.g. beads as see in Chapter 10). At times the distinction between spatial and feature will not be clear as the purpose for sampling is both. For example, the fire installation in Trench 10 was extensively sampled as a feature but also in distinct spatial units in order to assess any variation.

Processing: sorting and recording

The sample to be analysed is first floated, which removes loose soil and allows the collection of plants and other light material – the *light fraction.* The samples are then dried and the unsorted *heavy residue* is weighed before being sieved through a 1cm sieve. This removes all the large items, including stones. At this stage any artefacts are picked out by hand and recorded as artefacts larger than 1cm but remain associated with the sample. A small number of samples were wet-sieved as the light fraction was not of interest.

The remaining residue is put through a nest of sieves which sorts it by size: 1cm-4mm, 4mm-2mm and 2mm-1mm. The size fractions are weighed and the decision on the proportion to be sorted is made. The size fractions are divided using a riffle box to ensure accuracy and are then are sorted by type of material, such as pottery, bone, shell, lithics, etc. The sorted material is weighed and counted and these data recorded. For further description and illustrations see Iversen (2012).

Summer 2013 season activity

The 186 new samples which were processed during the season totalled 5,102 litres of sediment (see Fig.6.3. The average sample size was 27 litres, ranging from 77 litres to 1.5 litres; the size of strategic samples varied according to context, reason for sampling and deposit thickness while random samples were typically 30-35 litres. Small areas obviously produce smaller sample sizes. The samples were taken from 92 different contexts (see Table 6.1).

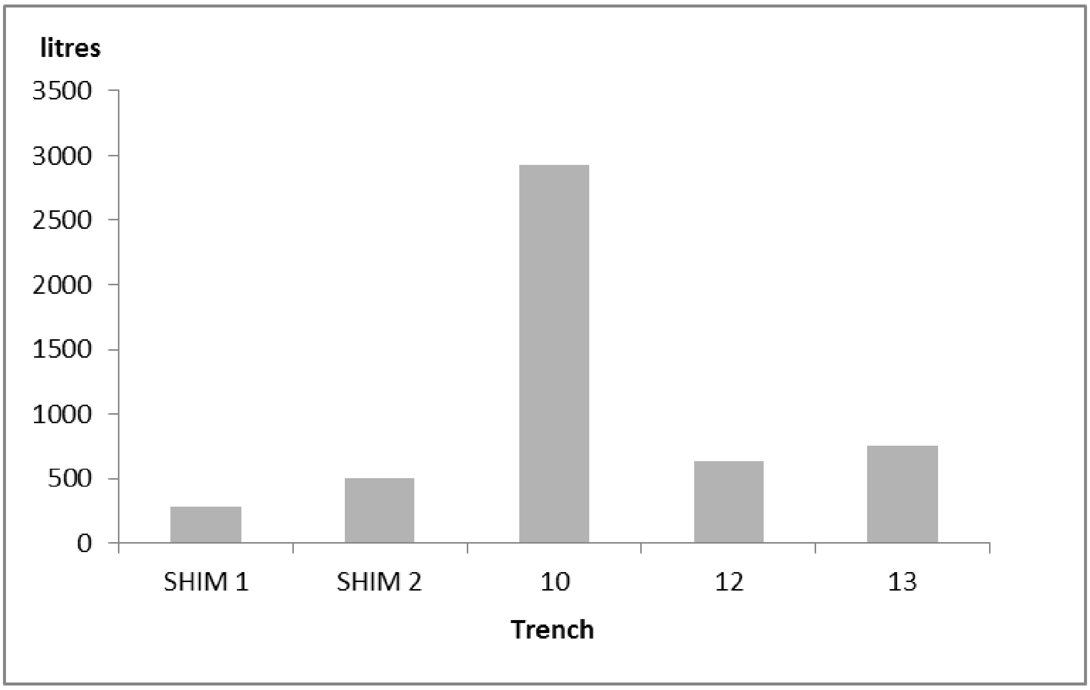

Figure 6.2. Volume of sediment floated

Heavy residue sorting

The majority (178 samples) were sorted by size and then by material. The 4mm fraction was sorted in its entirety in almost every sample but with the smaller size fractions a proportion was left unsorted in some cases. Overall, 84% of all heavy residue was sorted; 4 mm 96% and 2mm 71%. The results from the sorting of the smallest size fraction (1-2mm) in previous seasons have suggested 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).

A few samples (eight in total) were left unrecorded (but were sorted) either because of incomplete records (three samples) or a lack of time (five samples). The latter will be fully processed at the beginning of the next season as the first few days of the excavation does not produce heavy residue for the sorting team (as the samples have to be collected, floated and dried before the heavy residue can be sorted which can take 4-6 days) and this time can be used to deal with the previous season's backlog.

		Bestansur			Shimshara		
Trench		**10**	**12**	**13**	**1**	**2**	**Total**
Number of samples		114	24	20	11	17	186
Volume (litres)		2931	639	751	281	501	5102
Average sample size (litres)		25.7	26.6	37.5	25.5	29.5	27.4
Number of contexts		47	10	14	9	12	92
% sorted	**4mm**	93%	100%	100%	100%	96%	96%
	2mm	69%	90%	64%	88%	62%	71%

Table 6.1. Summary of activity

Methodology: a work in progress

Over four seasons of excavation, the processing of heavy residue has been improved through the pragmatic adjustment of the methodology based on practical experience. While the method being used has many similarities to work done elsewhere each site will pose its own challenges in terms of sampling and processing those samples. At Çatalhöyük, where there has been a programme of collecting and processing samples from 1995, 'methodological tensions' have encouraged changes to be made (Cessford and Mitrovic 2005b, 411-4).

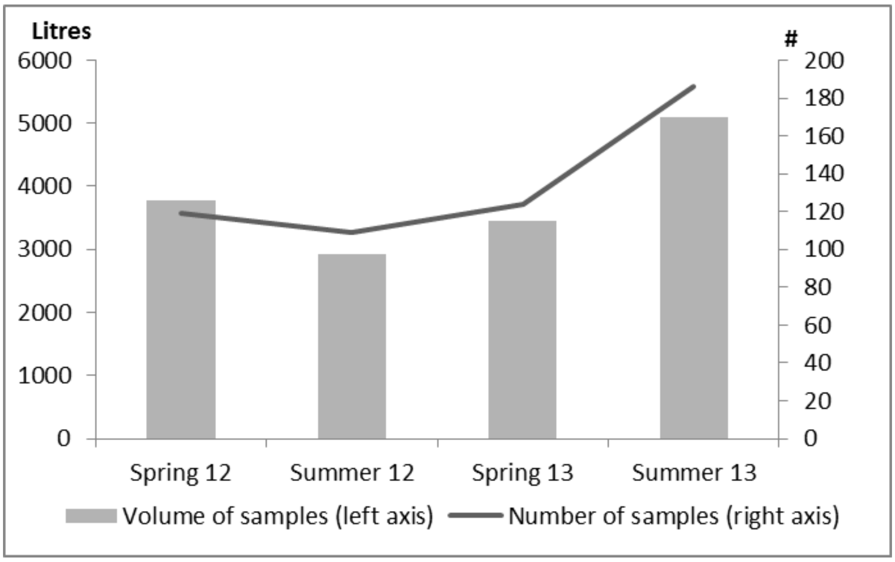

Figure 6.3. Samples processed by number and volume

This season saw the largest number of samples and greatest volume processed to date and raises questions of the capacity to increase this further. In each season, the number and volume of samples which have been processed have been the result of sampling decisions and it has been possible to accommodate almost all the samples collected (see Fig. 6.3).

Heavy residue processing capacity

During the Summer 2013 season capacity limits were reached and 22 of the larger samples had to be split with only a proportion being floated and sorted. The remaining portions of the samples were dry-sieved, the results of which are discussed below. In addition the heavy residue from a number of samples had to be wet-sieved again as the initial flotation left the heavy residue very dirty and thus unsortable. This also indicates a capacity problem as the samples had not been left long enough for all the sediment to be washed away or the flotation tank water was too dirty after a large number of samples, or possibly a combination of the two.

The key issue is the volume which can be floated or wet-sieved each day (150-200 litres) and the more than 5000 litres floated in a six week excavation season required both extra days to be worked and resulted in problems with some samples.

The sorting of heavy residue was not a problem despite the much greater number of samples as the women who sort the material are now fast and accurate and can more than keep up with what is processed through flotation. A further bottleneck is the checking and recording of the material but this can be addressed by allocating more resources to this task. Delays can have an impact on the work needing to be done by the specialists and so should be considered.

There are a number of ways in which the process can be enhanced and so avoid the risk of having to leave samples unprocessed.

- The size of samples has a direct impact on the number which can be processed as the key capacity constraint is the volume of sediment which can be floated. Smaller samples would ease this. (At Çatalhöyük one of the early changes made to the original methodology was a reduction in the size of sample from 60 litres to 30 litres, Cessford and Mitrovic 2005b, 411).
- Cleaning the machine more than once a day would allow capacity to be increased but would require extra resources (both work time and water) and may be difficult to organise.
- Wet-sieving using a different source of water would allow more samples to be processed for heavy residue (not for archaeobotanical material).

None of the above is without problems but all are worth considering. Knowing that the capacity will be reached after a certain point should play a role in sampling strategy and with discussion between all those concerned it can be possible to avoid the situation of having to leave samples unprocessed.

Wet-sieving *versus* dry-sieving

A number of samples were split with around a third being floated while the remaining portion was dry-sieved, as the capacity of the flotation machine had been reached. The 22 samples totalled over 1,100 litres and so were on average over 50 litres in volume. While being the result of necessity, this exercise allows a comparison in the results between the two methods and highlights the value of sorting samples after wet-sieving (see Table 6.2).

The density of microartefacts was seven times greater in the wet-sieved portion of the sample and with much more of all material, except lithics, being picked out. The high density of lithics in the dry-sieve portion will be investigated in the next season by examining the finds and the veracity of the recording. The high density of lithics is concentrated in just two samples.

This finding corresponds to other studies which have also observed that recovery rates are highest in wet-sieved samples as heavy residue is much easier to sort with a 'high degree of accuracy….because the washed fraction is clean'(Payne 1972, 53). In a study of four very different sites, Payne (1972) showed that for all material types the efficiency of recovery was greatly enhanced by wet-sieving (water-sieving). The experiments involved the sorting of 'soil units' first in the trench and then again after wet-sieving and recording the finds under the two methods. The checking of the sorted residue showed that after wet-sieving very little was being missed.

The results of the four cases were analysed by the different material. The percentage of lithics recovered in the trench ranged from zero at Sitagroi to 27% at Can Hasan III with the higher recovery rates found in sites with obsidian which is easier to spot even before 'washing'. The recovery rates when measured by weight were somewhat higher (up to 82%) reflecting the larger size of the pieces picked out in the trench. The study also looked at the relative recovery of animal bones and again found that wet-sieving the soil produced many more pieces of bone (Payne 1972).

Method	**Dry sieve**	**Flotation**
Density (g per litre)		
Bone	0.04	0.16
Shell	0.05	0.19
Lithics	0.12	0.07
Fired clay	0.01	1.09
Total	**0.22**	**1.50**

Table 6.2. Comparative results: dry sieve and flotation

The results

Density of material

The density of material is measured relative to the volume of sediment but can also be looked at relative to the total weight of the sample. The microartefacts are counted (except for molluscs) and these data are also presented relative to volume.

The data presented in the following charts and tables exclude the results from samples taken from post-Neolithic levels. The overall density of material, as shown in Fig 6.4, could indicate the intensity of activities in different areas of the site (both spatially and chronologically). It is also useful in giving an initial indication for the relative cleanliness of the different samples (Cessford and Mitrovic 2005a).

g per litre	Trench 10	Trench 12	Trench 13	Shimshara
Bone	0.08	0.34	0.15	1.01
Mollusc	0.43	4.45	1.35	0.28
Lithic	0.04	0.07	0.06	0.10
Fired clay	0.07	0.12	0.04	3.15
All material	**0.6**	**5.0**	**1.6**	**4.5**

Table 6.3 Density by type of material

Table 6.3 shows the density of material by type for each trench. Averages by trench are useful in providing a starting point for further investigation but a small number of data points can skew the results. A more useful overview is given by looking at the data by context types and work is underway to standardise the descriptions across all trenches.

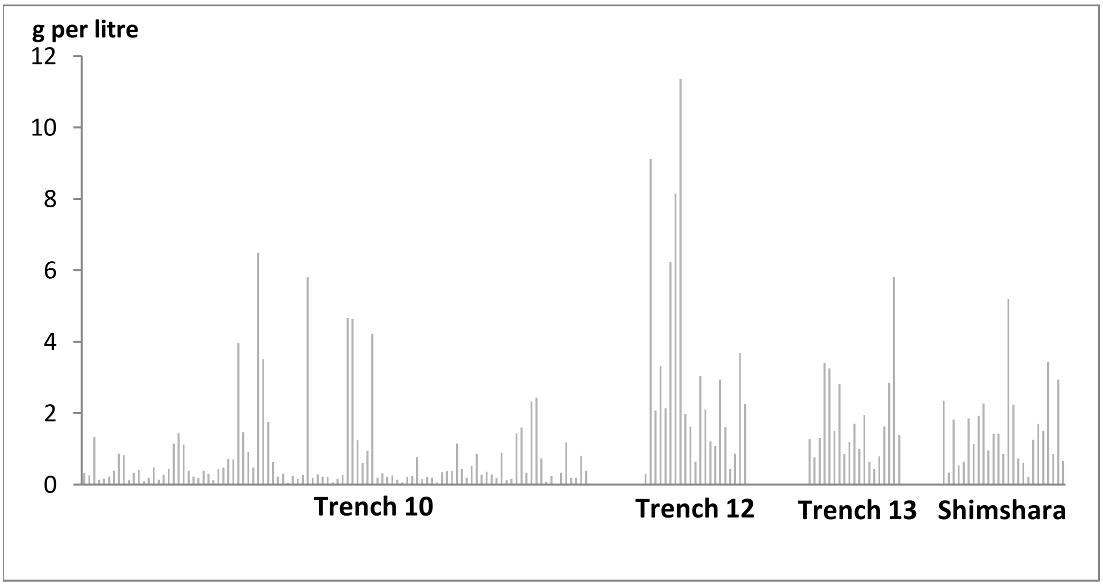

Figure 6.4 Density of all microartefacts by trench

Trench 10 results: spatial and chronological

Trench 10 was extensively sampled with a large number of samples collected in order to examine spatial variation. The results have been analysed both chronologically and spatially.

Figure **Error! Reference source not found.**6.5 shows the density of material for each space in the wo buildings ordered from the latest to the earliest contexts. In Building 5 there is little variation over time although the lowest level in Space 47 has an increased amount of fired clay. Space 42, on the 'outside' of the large space, produced more material. In Building 8, Space 55 has a greater density of material, dominated by molluscs.

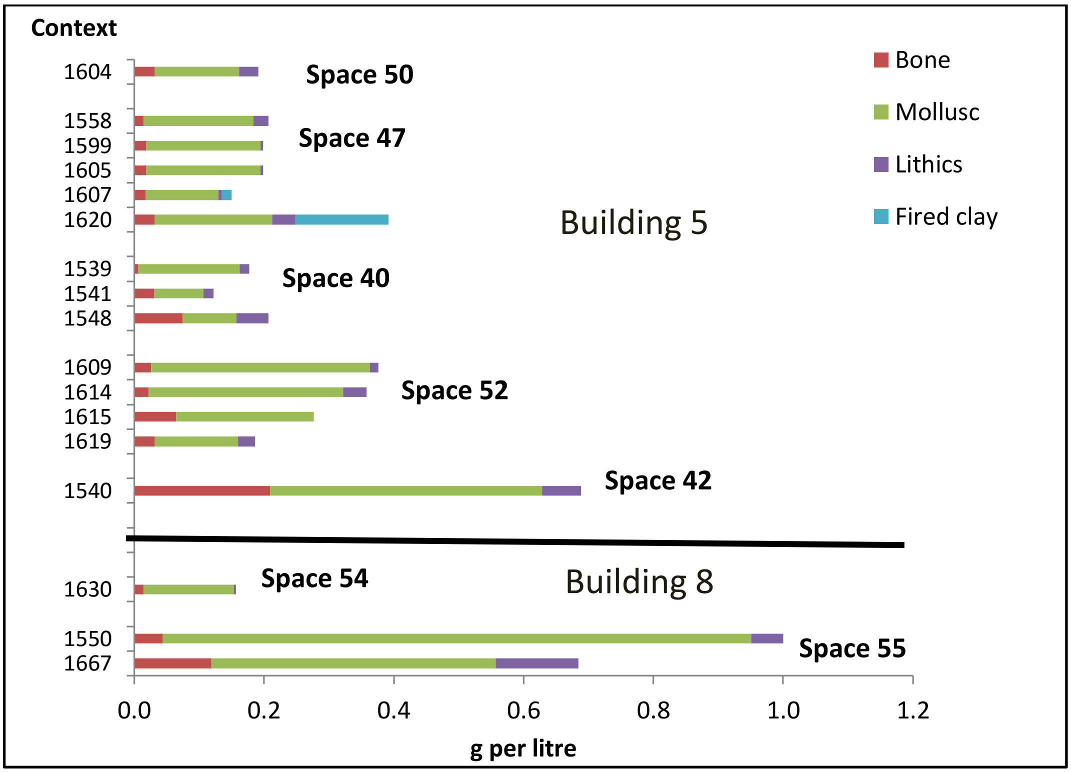

Figure 6.5: Trench 10: density of microartefacts by building and by space

Spatial sampling of one context in Space 47 showed a low density of material across the whole room although in the northwest quadrant there was more animal bone although still well below the site average. Only two samples (from the centre and the south-west of the space) had any lithics.

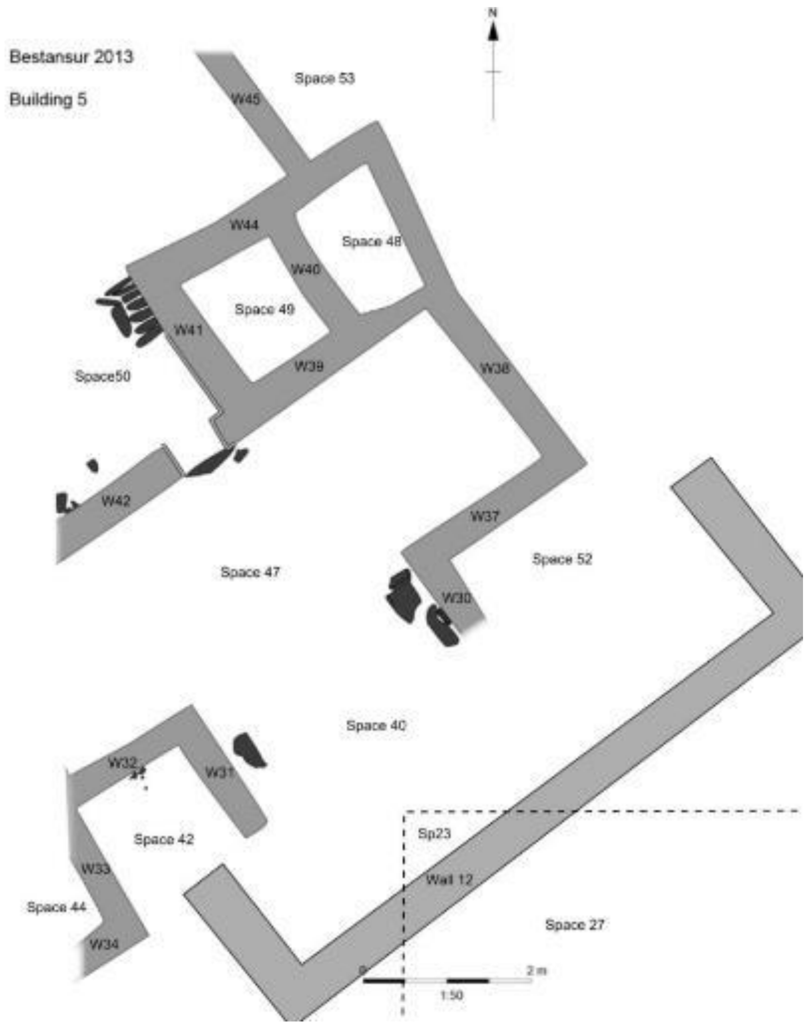

Figure 6.6. Building 5

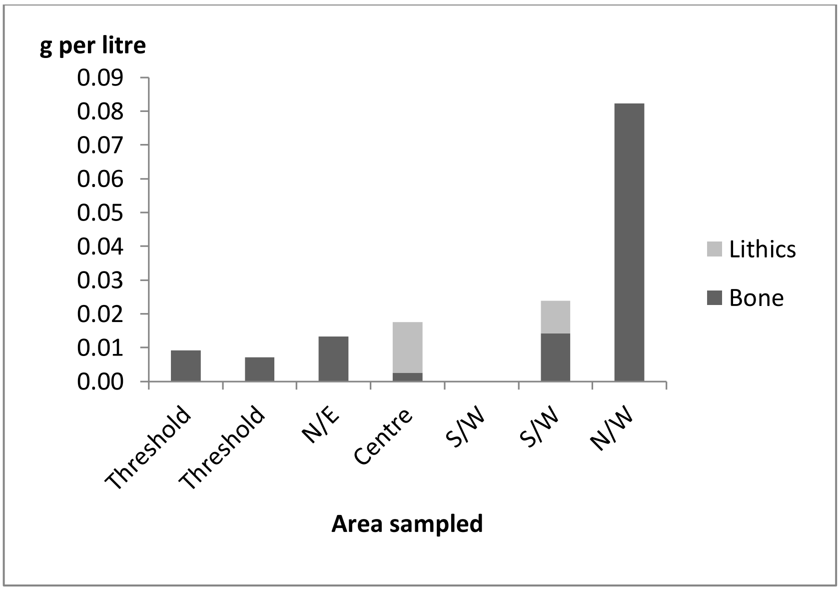

Figure 6.7. Density of material in Space 47, C1599

Trench 10: Walls

As the walls were removed samples were collected and processed in the normal manner. The results from the samples from seven walls associated with Building 5 are summarised in Table 6.4 and show that the material used has a very low density of microartefacts. This is a significant finding as it suggests that the results of the samples collected from floors and other surfaces are different to results from construction material.

	Bone	**Shell**	**Lithics**	**Fired clay**	**All material**
Density (g per litre)					
Walls	0.10	0.19	0.01	0.0	0.30
Trench 10	0.08	0.43	0.04	0.07	0.62
Trench 12 and Trench 13	0.27	3.18	0.07	0.09	3.62

Microartefacts which are incorporated into construction materials could mistakenly be taken as evidence for activities (Parker *et al.*, 2009, 94). Analysis at Çatalhöyük concluded that some of the material found in the floor sediment came from construction materials rather than being residues of activities as samples taken from plastered walls contained a similar mix of artefacts (Cessford 2003). At Bestansur further samples of wall material, from different buildings, will be analysed to test this finding, i.e. that there is little 'background noise' from construction material.

Trench 12 and 13

The results for Trench 12 and Trench 13 repeat those from the Spring 2013 season (Iversen, 2013b, 80). This is to be expected as the excavation is a continuation of the same areas. There is some variation between contexts (e.g. concentration of molluscs in some external areas) but in general the density of material is similar across the whole area (see Table 6.3).

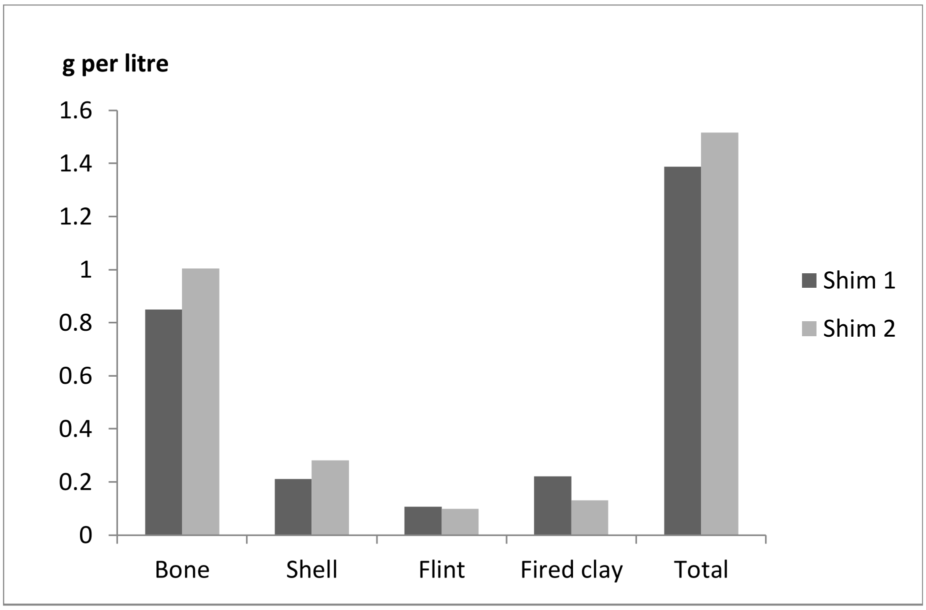

Figure 6.8. Shimshara - density of material

Shimshara

The two trenches excavated at Shimshara produced similar densities of microartefacts (see Fig. 6.8). All the samples had some bone and on average the Shimshara heavy residue has significantly more bone than the samples from Bestansur. In contrast the density of molluscs is much lower (see Table 6.3).

Small finds in heavy residue

Some artefacts are only recovered as a result of wet-sieving being too small to be spotted otherwise. In Summer 2013 a large number of beads were found in flotation samples collected in an area with human remains, many in the 2mm fraction of heavy residue. Both the 'washing' of the sample and its careful sorting allowed the small beads to be picked out (see Fig. 6.9).

Figure 6.9. Beads found in sample

Conclusions

The results

There is clear evidence for significant variation in the density of microartefacts at different spatial scales at Bestansur. Differences between trenches are most marked, but also there is also significant difference to be found chronologically. In Trench 10 the results from earlier seasons contrast sharply with some of the latest findings. The excavations in Trench 10 during the Spring 2013 excavation produced samples with much higher than average density of material while samples from the latest season had much lower than average density of material. This is a reflection of the type of contexts being explored, i.e. the buildings of the recent season compared with the 'external' areas of earlier seasons.

The spaces inside Building 5 were very clean and showed little variation across the 'room' suggesting few activities which leave a residue having taken place (and/or very thorough cleaning). This contrasts sharply with surfaces in other parts of the site where there was evidence of a range of possible activities as suggested by bone, lithic and mollusc microdebris.

Future work

The methodology for the processing, sorting and recording of heavy residue continues to be improved as each season presents new challenges. The volume processed in Summer 2013 was significantly more than in earlier seasons and highlighted some resource constraints, the key one being the volume of sediment that can be floated or wet-sieved under the current arrangements. Future excavation seasons will be able to benefit from the lessons learned with adjustments being made to the process without compromising the research goals. Discussions with excavators and others have been, and will continue to be, key to achieving the best outcome.

The priority is now to complete the analysis of the data collected during all the excavation seasons and this will be enhanced by the work currently underway to apply a standard and detailed labelling of all contexts. This will allow comparisons to be made across the whole site and will enable analysis of the microdebris densities against a matrix of criteria.

Chapter Seven: Preliminary Assessment of the Zooarchaeological Assemblage

Robin Bendrey

Introduction

This chapter briefly assesses the animal bone assemblages recovered from the CZAP excavations at Bestansur and Shimshara undertaken in Summer 2013. Analytical work undertaken during the Summer season also includes some material from the Spring 2013 season for which there was not sufficient time to complete the analysis during the Spring season. The report provides basic quantifications of recorded Neolithic bones. Due to the quantity of material coming up, producing a significant backlog of material by the end of the previous Spring season, some sub-sampling of the zooarchaeological assemblage has had to be practiced (see below). Recording is focussed on prioritising Neolithic material over post-Neolithic samples. The following report lays out a brief assessment of the preservation, nature and composition of this material.

Academic context

The shift from reliance upon hunted wild populations to the control and exploitation of domestic animals is one of the great step changes in the human past (Harris 1996; Barker 2006). It is now argued that the early domestication of sheep, goat, pig and cattle, in possibly multiple centres of the Fertile Crescent in the Near East, appears to have developed as a gradual process, evolving from hunting strategies and the intensification of relationships between humans and wild animals into the management of, at first, morphologically unchanged animals, generally within their natural habitat (Zeder 2005; 2009; Conolly *et al*. 2011; Vigne *et al.* 2011). These evolving human-animal relationships were connected with a range of fundamental economic, social, and ritual transformations – especially those related to mobility, sedentarisation, and animal and plant use (Barker 2006; Vigne 2011).

The study area encompassed by the Central Zagros Archaeological Project is of particular interest in relation to the early processes of goat domestication in particular. Current evidence indicates that initial goat domestication, possibly occurring multiple times, arose between around 8700 and 7900 BC in the region stretching from the Zagros Mountains, in the eastern Fertile Crescent, to the highlands of southeastern Anatolia (Peters *et al*. 2005; Zeder 2008; Pereira and Amorim 2010). The Central Zagros region lies within the natural habitat of wild goats, and is a region of particular interest in the early history of goat management and domestication (Zeder 2005; Pereira and Amorim 2010). The earliest archaeological evidence for the presence of domestic goats from this region comes from Ganj Dareh, where the demographic profile indicates a managed population of goats dating to *ca*. 7900 BC that are morphologically unaltered from wild animals (Hesse 1978; Zeder and Hesse 2000; Zeder 2005; 2008) [see Peters *et al*. (2005) and Vigne *et al.* (2011) for early evidence from other regions]. Current evidence indicates that domestic sheep, however, appear in the Central Zagros only from *ca*. 7000 BC (Zeder 2008), whereas initial sheep domestication may have occurred in southeastern Anatolia during the 9th millennium BC (Peters *et al*. 2005). Predating the latter, evidence for the intensive exploitation of wild sheep, as at Körtik Tepe, Turkey, (10th millennium BC), may represent a highly selective hunting that was perhaps a precursor to strategies of herd management in the region (Arbuckle and Özkaya 2006). In the lower Zagros region, both domestic sheep and goat are present in the Ceramic Neolithic assemblage at Jarmo (Stampfli 1983; Zeder 2008).

Research aims and objectives

Zooarchaeological analyses on the assemblages excavated within the CZAP research programme have the potential to contribute data and interpretations to a range of overlapping research themes that fall within the project aims (Matthews *et al*. in press). It is aimed that studies of the animal bones and teeth will be able to advancing knowledge in the following subject areas:

- processes of animal domestication
- human diet, economy and society
- wild animal resources
- ecology and environments
- sedentism and territorial use
- animal husbandry

The Zooarchaeological analyses will be fully integrated with the full range of research methods being applied by the CZAP team to investigate animal diet and management from GC/MS, micromorphological, phytoliths and archaeobotanical analyses (see other chapters).

Methodology

Recovery methods

Animal bones were collected by three different methods: hand-picking during excavation; dry sieving of the excavated sediments using a 4mm mesh; and wet sieving using a 1mm mesh. Material recovered from the integrated wet sieving and flotation programme typically consisted of 50 litres of deposit per context processed by machine assisted water flotation.

Identification and recording

The recording system for the Bestansur zooarchaeological assemblage was based on the protocols used at Çatalhöyük by Russell and Martin (2005, 34-38). The bones were identified with the aid of standard published protocols (e.g. Boessneck 1969; Halstead and Collins 2002; Lister 1996; Prummel and Frisch 1986; Schmidt 1972; Zeder and Lapham 2010; Zeder and Pilaar 2010). Bones not identified to species have been awarded an animal-size category, or labelled indeterminate. Material that could not be identified in the field has been exported to England for checking against modern osteological reference collections. Identifications reported in this assessment are provisional – some of these will change as further work is undertaken and specimens are compared to more comprehensive osteological reference collections (including the Natural History Museum collections in London and Tring).

Zooarchaeological assemblage sub-sampling protocol

In the first two excavation seasons at Bestansur (conducted in Spring and Summer 2012) almost all zooarchaeological remains recovered via hand-recovery, dry-sieving and wet-sieving were fully recorded using the protocols laid out in Bendrey (2012). A significantly larger assemblage of animal bones was recovered in the third season (Spring 2013), deriving from extensive excavations by a larger team, and it was not possible to record all of this material during the course of the field season. It was therefore necessary to identify material for priority recording and a sub-sampling protocol.

Selection of material for priority recording, by period

In the first instance all stratified Neolithic material will be prioritized over the Iron Age and later deposits, which tend to derive from mixed contexts. Prioritization of material within the Neolithic assemblage will follow the practices used at Çatalhöyük by Russell and Martin (2005). Applying this to the CZAP material involves the following protocol.

Selection of material for priority recording, by recovery method

All mammalian macrofauna recovered by hand-excavation, dry-sieving and the 4mm fraction from wet-sieving are recorded. Exclusion of the 1mm and 2mm fraction is justified on the basis that at Bestansur, as at Çatalhöyük, only a very occasional diagnostic specimen of mammalian macrofauna is recovered from the 2mm and 1mm fractions of the heavy residue (Russell and Martin 2005, 34). In addition, the 1mm and 2mm fractions provide limited taphonomic data, which when present generally replicates the better quality data from the 4mm fraction.

All diagnostic elements of bird, fish, herpetofauna and mammalian microfauna will be recorded from all processed heavy residue. Experience at Bestansur so far shows that fish and mammalian microfauna predominantly derive from the 2mm fraction, and birds from the 4mm fraction.

Selection of material for priority recording, by context

Given the quantity of backlog from the previous season (deriving from Trenches 9 and 10) at Bestansur, it has been necessary to sub-sample material from the Neolithic contexts. The practice for this employed at Çatalhöyük was based upon a targeted sampling rather than a random sampling protocol (Russell and Martin 2005, 35). This was based on a flexible approach in which priorities were negotiated among the various specialists and excavation staff, with particular attention given to maintaining roughly proportionate representation of the different context types. Bestansur priorities were decided in the same way. Exclusion of material was based upon the limited returns that it can provide for project aims, for example, as stated by Russell and Martin, 'arbitrary' excavation units are mixed and not particularly worthy of study.

Context selection: summary

In the first instance Neolithic stratified contexts are prioritised over post-Neolithic contexts. During the Summer 2013 field season, it was possible to record all Neolithic contexts from Spring and Summer seasons 2013, except for a relatively small number of mostly disturbed or truncated contexts from Trenches 9 and 10. This also includes a small number of contexts containing intrusive material identified during the post-excavation assessment.

The animal bones from Bestansur

Preservation and taphonomy

The assemblage was scored for general conditions of preservation (excellent, good, fair, and poor) and broad taphonomic characteristics (battered, rounded, spikey, and variable) (O'Connor 1991, 234-235). The latter was assessed in order to distinguish between those contexts where bone fragments retained sharply angular margins to old breaks, those that exhibited a rolled/abraded appearance, and those that exhibited impact pitting/battering. As in previous seasons, the assemblage is generally well preserved, with most of the material exhibiting a good quality of preservation and a 'spikey' appearance.

Quantification and distribution of zooarchaeological remains

The zooarchaeological assemblage analysed to date from those Aceramic Neolithic contexts recovered from Bestansur is presented in Table 7.1. This groups the material recovered by all recovery methods together for this assessment (see discussions in previous archive reports – Bendrey 2013a, 2013b), and presents the zooarchaeological assemblage by season of excavation, from which it is possible to see how the new data add to our understanding of the site as a whole. In general, the assemblages recovered from the Summer 2013 excavations in Trenches 10, 12 and 13 are similar in relative composition and character to those previously recovered from these trenches (Table 7.1).

Figure 7.1 presents the relative proportions of the identified large- and medium-sized mammalian taxa exploited at Early Neolithic Bestansur – those animals that would have made up the bulk of the meat contribution to the human diet. This analysis makes an adjustment to the data in terms of the material identified as sheep/goat (*Ovis/Capra*) (Table 7.1). Sheep and goats have very similar skeletons (e.g. Zeder and Lapham 2010; Zeder and Pilaar 2010), and it is often the case that disarticulated and fragmented bones of these species are not separated during archaeological analysis. However, understanding the variation in representation in these two taxa is essential for understanding their respective pathways to domestication in the eastern Fertile Crescent, and the role of environmental factors influencing hunting and animal husbandry (see Bendrey 2013b). As a relatively high proportion of sheep and goat remains can end up being classified as sheep/goat, then comparison of just those remains recorded to species level could significantly under-estimate the representation of these species relative to other species. Here, those remains identified to 'sheep/goat' are re-apportioned to 'sheep' and 'goat' according to the ratio of the identified bones to these two taxa in the total assemblage.

Figure 7.1 shows that the material excavated from Trenches 10, 12 and 13 during the Summer 2013 season is very similar in overall composition and character to the total assemblage overall. Variations in the two datasets may be due to relatively small assemblage size or area-specific activities. For example the absence of cattle (*Bos*) remains from the Summer 2013 material could be associated with the fact that the excavations were conducted relatively close in to the mound, and large-sized animals, such as cattle, tend to be better represented in peripheral areas further from the centre of the mound (Bendrey 2013b).

A number of other features of the Summer 2013 assemblages are worthy of brief discussion here. House mouse (*Mus* sp.) remains are recorded from Trench 10; whereas previously they were positively identified from Trenches 12 and 13. The significance of the house mouse remains will be discussed further below.

A complete medium-sized carnivore skeleton was recovered from C1527 in Trench 12 (Fig. 7.3). The skeleton is from an immature animal (all post-cranial elements unfused). Identified as medium-sized carnivore in Table 7.1, it is probably that of a fox or jackal rather than dog, and is likely intrusive into the context (precise identification needs to be verified).

As in previous seasons, small numbers of crab remains were found (Table 7.1). We also recorded modern surface finds of land crab exoskeleton remains near the spring at Bestansur that appear to display the same morphology as the Neolithic finds (see Figs 7.3-4; species identifications need to be verified).

A notable feature from the Summer excavations was the relatively low density of bones from the contexts associated with the mud-brick building (see Chapter Six, microarchaeology). This feature is hinted at in Table 7.1, when we consider the smaller assemblage recovered from Trench 10 in Summer 2013 than in Spring 2013 in the light of the significantly greater volume of material excavated in the Summer season. It will be possible to calculate relative densities from the relative phases and areas of the site when final grouping of stratigraphic units are made in the post-excavation analysis and context volumes can then be calculated and summed.

The animal bones from Shimshara

Preservation and taphonomy

As in the previous season's excavations at Shimshara, the quality of preservation of the animal bones recovered was very good, with material tending to receive scores of either excellent or good for all contexts. Bone fractures also exhibited 'spikey' appearances, suggestive of relatively quick burial and limited post-depositional taphonomic attrition of the sample.

Quantification and distribution of zooarchaeological remains

The zooarchaeological assemblage analysed from the Neolithic contexts at Shimshara is presented in Table 7.2. This groups the material recovered by all recovery methods together for this assessment, as above. A number of features of the data in Table 7.2 are notable. In the Summer 2013 material, the higher numbers of small indeterminate mammalian fragments and also small taxa (e.g. fish and micro-mammal) may be due to both the extensive sampling and sieving programme undertaken and also, perhaps, the contexts being targeted. Absence of some taxa from the Summer 2012 assemblage may be linked to the identified assemblage size. The number of different species, or taxa, recovered from an archaeological assemblage is in part related to the size of the assemblage, and it is the case that 'rarer' animals are likely to appear in larger samples and not in smaller ones, whereas commoner animals will appear in relatively small samples (Grayson 1984; Lyman, 1995). The absence of red deer (*Cervus elaphus*) and gazelle (*Gazella* spp.) from the Summer 2012 material may thus be due to sample size.

Calculation of the relative proportions of the large-sized and medium-sized mammalian exploited at Early Neolithic Shimshara taxa (as discussed for Bestansur above) reveals similar compositions for assemblages from both seasons of excavation (Fig. 7.5). This shows we are effectively and consistently recovering material and supports the interpretations of species compositions made on the smaller assemblage previously excavated (Bendrey 2013a; 2013b). However, although we have confirmation of the earlier data on species proportions we must be wary, for the moment, of assuming that the composition of animals represented is reflective of the complete picture of the diet economy of the Neolithic community at Shimshara. Zooarchaeological assemblages are known to vary in composition across settlement sites (Wilson 1996), as we have shown to be the case in the material from Neolithic Bestansur (Bendrey 2013b), and the animal bone assemblage at this 'peripheral' location at the edge of the archaeological mound may relate to spatially-specific activities or discard practices undertaken here and could differ significantly in character to material deposited elsewhere in the settlement.

The 2013 season at Shimshara produced a pathological goat specimen. This is a left mandible from C1653 (Figure 7.6). In this specimen, the loss of the opposing M^2 has resulted in the M_2 (distal column) and M_3 (mesial column) being significantly less worn. Although we cannot draw form conclusions from a single specimen, studies of pathology in large samples can indicate changes in the environment, demography, and use of animals through time and can potentially make valuable contributions to understanding of early domestic animal husbandry (Bendrey 2014).

A notable addition to the spectrum of taxa identified from Shimshara is gazelle, an animal typical of the drier steppe environments (Figure 7.7).

Discussion

Comparison of the material excavated during the Summer 2013 season at Bestansur and Shimshara with that from previous seasons reveals close similarities in the general character and patterns of species proportions. This supports our preliminary conclusions on regional ecological variation and economic use of the various taxa (Bendrey 2013b).

With continued excavation we are increasing sample sizes for the sites as a whole, which can contribute to a range of studies such as animal population age and sex structure. For example, although sample sizes are still relatively small, it is now possible to confirm that the Neolithic inhabitants herded domestic goats. We can interpret a dominance of females in the Bestansur population (Figure 8) through comparison with known expression of sexual dimorphism in goat populations, and the larger dataset published from Neolithic Ganj Dareh (Zeder 2008). The Neolithic levels at Bestansur, and the goat remains themselves, are directly dated by a radiocarbon determination from a goat tibia (C1412, Trench 10) to 7720-7580 cal BC (2 sigma; Beta-368943) (see Chapter 2). The CZAP research programme is thus contributing new details to our understanding of the origins and diffusion of goat husbandry in the eastern Fertile Crescent. The earliest known management in the region is in the highlands of the Zagros, in the natural habitat of goats at Ganj Dareh (*c*.7900 BC) based on studies of goat demography (Zeder 2008; 2005; Zeder and Hesse 2000). CZAP excavations have also identified penning at Sheikh-e Abad (*c*.7500 BC), a site whose bone assemblage is also dominated by goats and is also located in the highland Zagros (Bendrey *et al.*

2014; Matthews *et al.* 2014). Goat husbandry then diffuses moves out from the highland region, reaching Bestansur in the western piedmont by 7720-7580 BC (Fig. 7.8) and reaching Ali Kosh in the southern Zagros by *c*.7500 BC (Zeder 2008; Hole *et al*. 1969). It is not until the Ceramic Neolithic at Jarmo (*c*.7000 BC) that goat becomes the dominant taxa in site assemblages in the Central Zagros piedmont zone (Bendrey 2013b; Stampfli 1983; Zeder 2008). Research is currently ongoing to assess the status of the pig populations at Bestansur and Shimshara.

Ongoing research on the house remains suggests the possibility that these may be intrusive into the Neolithic levels, from the later overlaying Iron Age settlement. This is suggested by a number of strands of evidence. House mouse and small mammal remains tend to be better preserved than macro-mammals in the same context (Figure 9). This variation in preservation indicates different taphonomic pathways as the material entered the archaeological record. There also seems to be an association between intrusive lentils (see previous archive reports) and concentrations of small mammal remains. This is the case, for example, with the later C14 dated lentils from C1388, where we also have a concentration of house mouse remains. Further, the cavities in house mouse burrows are approximately the same size as the intrusive lentil patches in Trenches 12 and 7. The mean (single) cavity size in house mouse burrows is 2388.7 +/- cm^3 (Schmid-Holmes *et al.* 2001), which equates to ~13x13x13 cm; and intrusive lentil patches are <6-15 cm in diameter (Matthews 2012). House mouse dig extensive burrows, 2-3cm in diameter and up to 8m long, and are inveterate hoarders (Schmid-Holmes *et al.* 2001), and based on considerations of taphonomy and house mouse ecology it proposed that at least some of the house mouse remains are intrusive within the Neolithic levels at Bestansur. They are probably commensals associated with the Iron Age town imprinted over the Neolithic settlement. A number of other burrowing taxa have been recorded from the zooarchaeological assemblage (in addition live small mammals and snakes have been observed within the structure of the mound during the course of the excavations, and consideration of their potential intrusive status should be considered in ongoing analyses. These interpretations of the house mouse remains can contribute to understanding of the taphonomic history of the site and its deposits and help select good samples/areas for excavation and analysis, and secure contexts for C14 dating of charred plant remains.

Conclusions and future prospects

This preliminary assessment of the zooarchaeological remains from Early Neolithic Bestansur and Shimshara presented in this chapter contributes to a number of research strands. We are developing understanding of spatial variability and assemblage formation processes at both sites (see also Bendrey 2013b).

As we increase sample sizes, we are also able to contribute more detail to interpretations of the status and uses of the animals identified at the sites, and contribute to regional narratives of the origins and diffusions of domestic animals. With the growing assemblage size that we achieve as each excavation season is completed we are gradually building a corpus of data that is able to contribute to understanding of the status of the animal populations at Bestansur and where they sit on the wild-domestic spectrum (e.g. through the analysis of age and metrical data). It will be important to continue this work to build up a sample size that can be used to address these questions.

Further work on this material will involve the verification/refinement of taxonomic identifications through comparison to comprehensive, regional-specific, osteological reference collections (e.g. those at the Natural History Museum, London). It is planned to undertake geometric morphometric analysis of the pig and house mouse remains through collaboration with Dr T Cucchi (CNRS/MNHN).

We also need to elaborate the integration of our separate strands of data for the understanding of Early Neolithic lifeways, in both practice and theory. This will include, for example, how Neolithic peoples may have integrated animal husbandry and plant cultivation (e.g. Bogaard 2005; Henton 2012), and how this translates into potentially varying seasonal and geographical rhythms. This will be aided and enriched by our on-going ethnographic studies. It will also be necessary to consider the articulation of plant and animal foods within the diet of the inhabitants of the site, such as in what seasons the foodstuffs were available, methods of food preservation and storage, and relative possible contributions. It will be in the knowledge of food processing and preparation, and the seasons and circumstances of food collection, processing, consumption and storage that the conceptualisation and analysis of meals, feasting and food sharing will articulate with wider studies of society and ritual in the processes of Neolithisation in the eastern Fertile Crescent.

Acknowledgements
Thanks to Dr Louise Martin (UCL) for kind support and digital resources/databases.

Table 7.1. Distribution of Neolithic animal bone recorded from Bestansur by trench and season, by all recovery methods (number of fragments - NISP). Note: sp12=Spring 2012, su13=Summer 2013, and so on.

Trench	**1**	**2**	**4**	**5**	**7**		**8**	**9**		**10**			**12**		**13**		**Total**
season	**sp12**	**sp12**	**sp12**	**sp12**	**sp12**	**su12**	**sp12**	**sp12**	**sp13**	**sp12**	**sp13**	**su13**	**sp13**	**su13**	**sp13**	**su13**	
Large-sized mammals																	
Bos	-	5	1	-	4	12	1	-	-	1	1	-	1	-	-	-	26
Large bovid	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2
Cervus elaphus	-	1	-	-	1	2	1	-	18	-	15	5	-	1	3	-	47
Large cervid	-	-	-	-	-	4	-	-	8	-	2	1	-	-	-	1	16
Large-sized indet.	1	16	7	3	8	100	6	12	56	14	76	16	6	3	1	17	342
Medium-sized mammals																	
Capra	-	-	-	-	5	3	2	-	10	1	6	1	-	-	-	-	28
Ovis	-	1	-	-	3	4	1	-	32	2	20	10	2	1	2	-	78
Ovis/Capra	-	2	7	-	9	15	2	-	88	20	45	21	8	1	3	2	223
Sus scrofa	-	5	1	-	-	8	1	-	54	5	74	18	6	3	8	3	186
Gazelle	-	-	-	-	-	-	-	-	6	-	12	4	1	-	-	-	23
Dama dama	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
Capreolus capreolus	-	-	-	-	-	1	-	-	-	2	2	-	2	3	-	-	10
Small cervid	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1

Equus hemionus	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Small-medium equid	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	2
Large canid	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Ovis/Capra/Capreolus/Gazelle	3	-	3	1	2	25	1	2	74	5	50	29	13	7	4	2	221
Medium-sized indet.	9	10	68	3	32	200	20	10	754	59	732	320	80	89	49	69	2504
Small-sized mammals																	
Vulpes vulpes	-	-	-	-	-	3	-	-	-	-	-	2	-	-	-	-	5
Medium canid	-	-	1	-	-	-	-	-	2	-	2	-	-	-	-	-	5
Medium carnivore	-	-	-	-	-	1	-	-	1	-	-	2	1	7	-	-	12
Small carnivore	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	-	2
Lepus	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	1	4
Small-sized indet.	-	-	2	-	1	6	1	3	22	-	7	12	4	9	-	5	72
Micro-mammals																	
Mus sp	-	-	-	-	-	-	-	-	-	-	-	3	4	5	1	4	17
Talpa europaea	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Microfauna indet.	27	-	11	1	2	18	2	3	16	1	20	26	57	67	39	53	343
Mammal indet.																	
Indeterminate	113	97	401	24	159	1612	192	232	3057	64	2287	693	1597	787	1124	243	12682

Birds																	
Birds	1	1	5	0	3	15	1	2	59	1	7	40	12	66	16	37	266
Reptiles																	
Tortoise	-	1	1	-	-	13	-	1	7	-	51	9	-	3	1	1	88
Snake	2	1	-	-	-	-	1	-	26	-	11	3	6	58	7	10	125
Amphibians																	
Amphibian	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	2
Fish																	
Fish	-	-	1	-	-	28	-	-	8	1	3	7	78	285	52	67	530
Crustacea																	
Land crab	-	-	-	-	-	3	-	-	3	-	2	3	6	3	4	-	24
Total	156	142	510	32	229	2076	232	265	4306	176	3427	1226	1885	1400	1315	515	17892

Table 7.2. Distribution of Neolithic animal bone recorded from Shimshara by season, by all recovery methods (number of fragments - NISP).

	Summer 2012	Summer 2013	Total
Large-sized mammals			
Bos	5	4	9
Cervus elaphus	-	3	3
Large cervid	1	4	5
Aurochs/bison size (larger than medium cattle)	-	1	1
large-sized indet.	11	56	67
Medium-sized mammals			
Capra	8	6	14
Ovis	22	6	28
Ovis/Capra	12	25	37
Sus scrofa	86	67	153
Gazelle	-	2	2
Dama dama	1	5	6
Capreolus capreolus	1	3	4
Ovis/Capra/Capreolus/Gazelle	15	31	46
Medium-sized indet.	131	429	560
Small-sized mammals			
Vulpes vulpes	1	2	3
Medium carnivore	-	3	3
Lepus	-	1	1
Lagomorpha	-	1	1
Small-sized indet.	1	14	15

Micro-mammals			
Mus sp.	-	2	2
Erinaceus europaeus	-	1	1
Microfauna indet.	-	55	55
Mammal indet.			
Indeterminate	92	2082	2174
Birds			
Birds	12	30	42
Reptiles			
Tortoise	-	2	2
Snake	-	16	16
Amphibians			
Amphibian	1	4	5
Fish			
Fish	2	113	115
Crustacea			
Land crab	-	1	1
Total	**402**	**2968**	**3371**

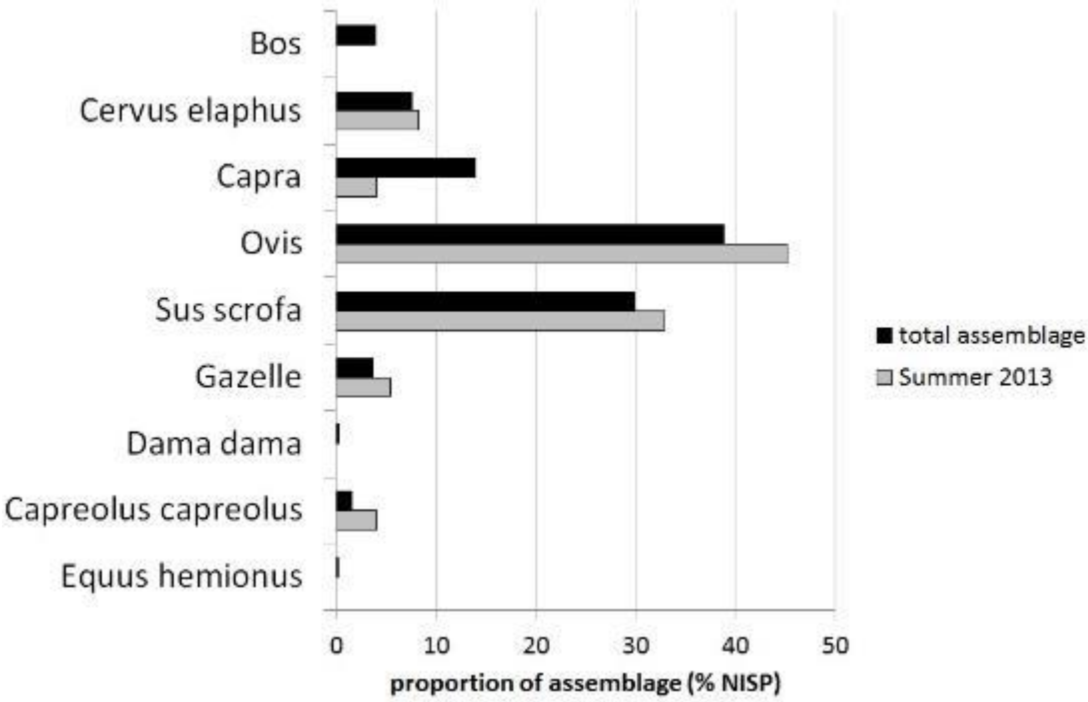

Figure 7.1. Relative representation of mammalian taxa from Bestansur (%NISP).

Figure 7.2. Left upper fourth deciduous premolar (dP[4]) from medium-sized carnivore skeleton (C1527: metrics: L=7.8mm; B9.2mm).

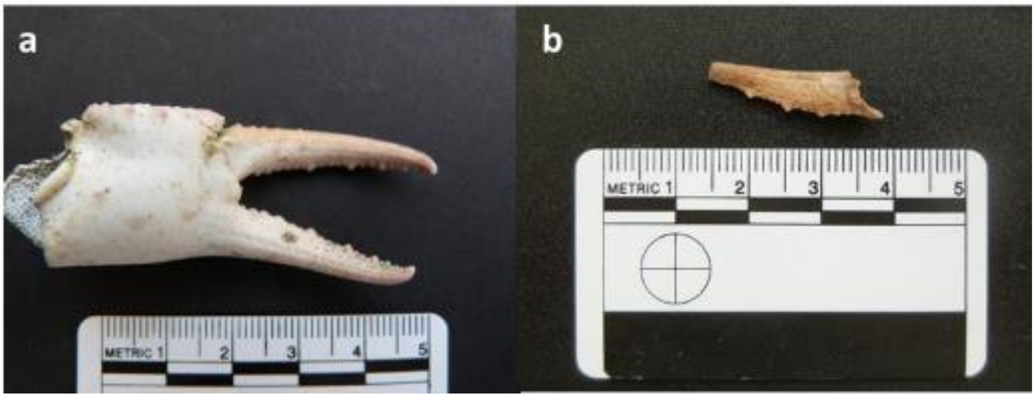

Figure 7.3. Crabs: a) surface find near the springhead at Bestansur of modern crab claw; b) Neolithic crab claw (C1152).

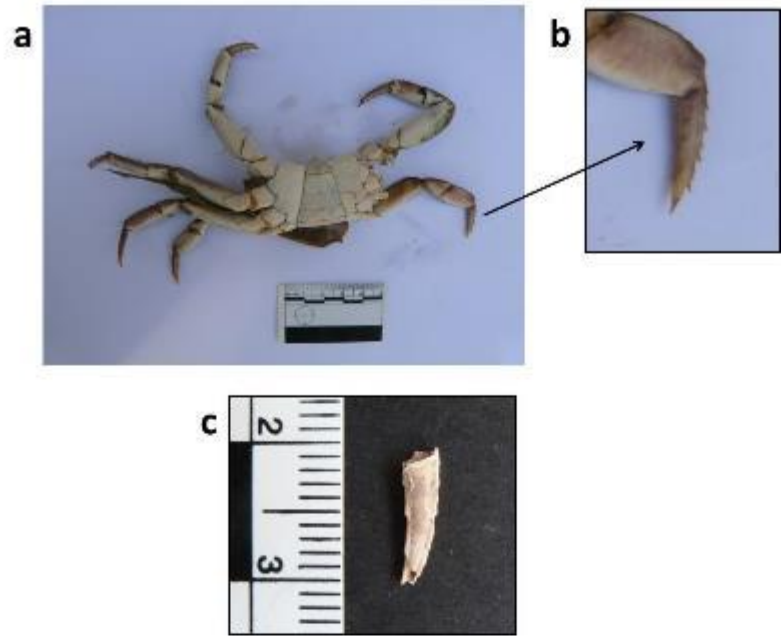

Figure 7.4. Crabs: a) surface find near the springhead at Bestansur of modern crab exoskeleton; b) detail of skeleton; c) Neolithic find (C1523; S1382).

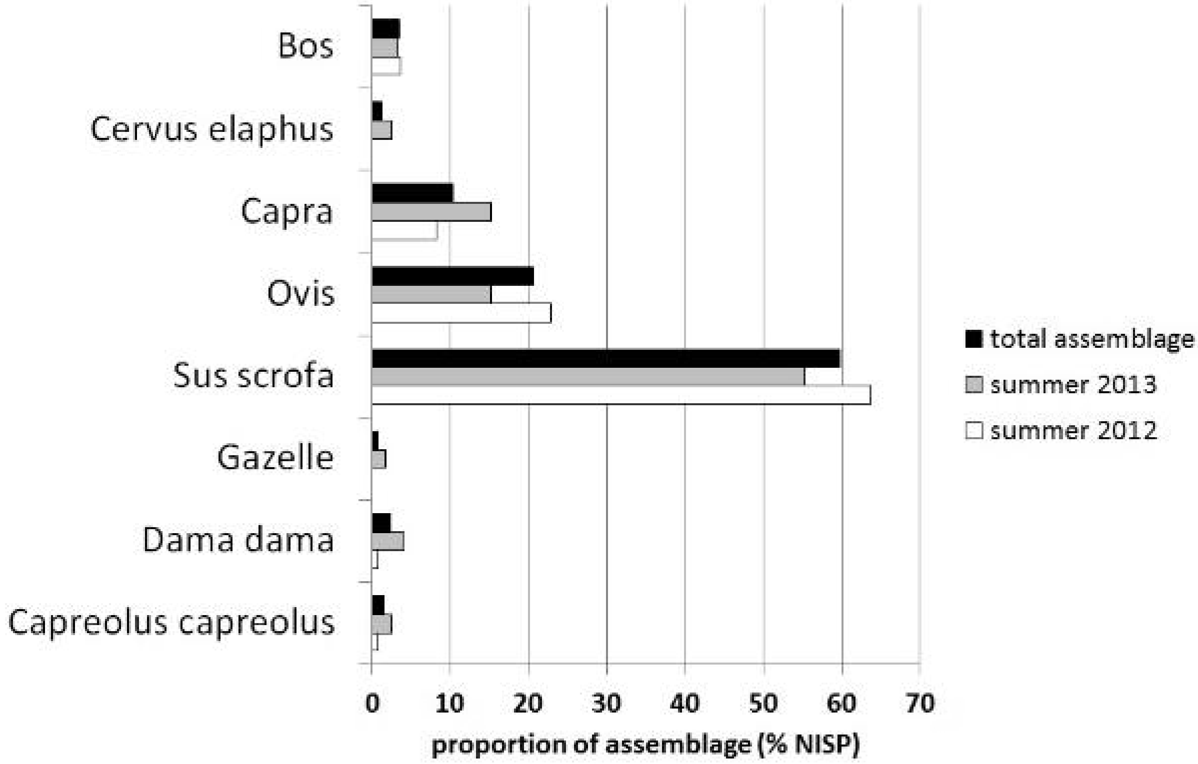

Figure 7.5. Relative representation of mammalian taxa from Shimshara (%NISP).

Figure 7.6. Left goat mandible from Shimshara (C1653). Loss of the opposing M^2 has resulted in the M_2 (distal column) and M_3 (mesial column) being significantly less worn (projecting up ~10mm from the occlusal line).

Figure 7.7. Left gazelle mandible from Shimshara (C1647).

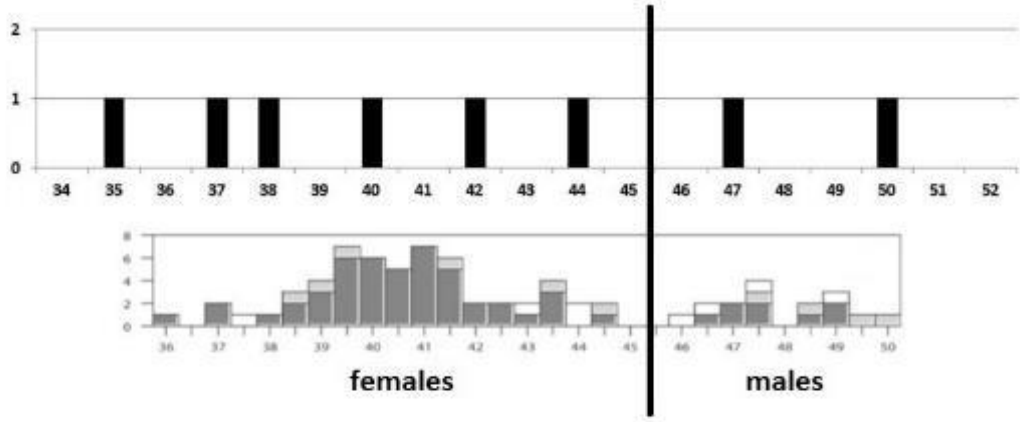

Figure 7.8. Goat 1st phalanx GL measurements (in mms) from Neolithic Bestansur compared to those from Ganj Dareh (lower graph from Zeder 2008, figure 4). Smaller bones to the left of the vertical line are interpreted as females, larger elements to the right as males.

Figure 7.9. House mouse and small mammal remains tend to be better preserved than macro-mammals in the same context (C1528, S1429 (4mm fraction) - Trench 12, Neolithic context, excavated Summer 2013)

Chapter Eight: Archaeobotany

Michael Charles, Golnaz Ahadi and Jade Whitlam

Introduction

Following the protocols described previously, a programme of systematic sampling and flotation of soil samples was undertaken for the recovery of plant remains during the field season.

Flotation was carried out by women from Bestansur village supervised by Golnaz Ahadi and Ingrid Iversen. Scanning and sorting of the flots in the field lab was carried out by Golnaz Ahadi and Mike Charles while Jade Whitlam scanned a series of samples from Bestansur Trench 10 as part of her PhD thesis.

Introduction

During the season 4348 litres of soil were processed in a flotation machine comprising 187 samples from 98 contexts (see Table 8.1 and Table 8.4). The samples were from excavated units in Trenches 10, 12 and 13 from Bestansur and Trench 1 and 2 from Shimshara, with the bulk of the samples and the soil coming from Trench 10. Individual samples ranged in size from 1.5 to 77 litres; the average sample size was 27 litres. Few charred plant remains were observed while the samples were floated and the flots had a high frequency of modern plant material present. The dried flots were exported for further analysis in the UK

Table 8.1. Summary of the Bestansur samples floated by trench.

Trench	No. of samples	No. of contexts	Sum of vol. (L)	Average vol. of soil floated(L)
1	1	1	23	23
10	114	51	2932	26
12	24	10	638	27
13	21	16	755	36
Grand Total	160	78	4348	27

In addition to the bulk soil samples, 19 botanical blocks of soil were taken for the purpose of investigating the preservation of plant material in the Bestansur deposits. These blocks were approximately 5 x 5 x 10cm cubes of unfloated soil taken from deposits recognized during excavation as having charred plant material in them. These blocks were exported unprocessed to the UK for further analysis.

Field lab scanning and sorting

A limited number of samples were scanned (N=15) and sorted (N=6) during the excavation season under a low power stereoscopic microscope. As noted above the flots primarily comprised modern plant material (root, stem, leaf and seed), with large numbers of burrowing snails and the occasional charred plant item (crop seed or chaff).

Lab scanning in Oxford

A total of 114 samples from 51 contexts within trench 10 were scanned to assess their composition. All fractions were scanned under a low power stereoscopic microscope at magnifications of x6 – x50 and any identifiable charred plant material was recorded along with the following categories: root fragments, burrowing snails, modern seeds (including cereal types), and partially burnt chaff/plant material.

Table 8.2. Occurrence of charred plant remains in samples.

Number of charred plant remains	Count of samples	Percentage of samples
<10	110	96
10 -25	4	4
>25	0	0

Few charred plant remains were identified during scanning with the majority of samples (96%, N=110) producing <10 items (Table 8.2). The remaining samples (4%, N=4) producing in the range of 10-25 items. The flots are dominated by modern root material and burrowing snails. These occur frequently within Trench 10 and have been recorded in 83% (N=95) of samples. Modern seeds and plant material also occur occasionally (Table 8.3). These results support the analysis carried out in the field during the season.

Table 8.3. Occurrence of non-archaeobotanical material within 114 samples from Bestansur, Trench 10.

Material	Count of samples	Percentage of samples
Root fragments	95	83
Large root fragments	3	3
Burrowing snails	95	83
Modern seeds	11	10
Modern cereal	4	4
Partially burnt chaff/plant material	8	7

Shimshara

A small number of soil samples were taken from Shimshara and processed at Bestansur (see Table 8.4). Flots of these samples have not yet been processed.

Table 8.4. Summary of the Shimshara samples floated by trench.

Trench	No. of samples	Sum of vol. (L)	Average vol. floated [L]
1	10	259	26
2	17	501	29
Total	28	783	28

Chapter Nine: Chipped Stone Tools and Debitage

Roger Matthews, Amy Richardson and Golnaz Ahadi

Introduction

Basic processing of chipped stone assemblages took place throughout the Summer 2013 field season. Much of the work was focused on recording a backlog of material from previous seasons. Little processing was undertaken of materials from Buildings 5 and 8 in Trench 10 from the Summer season, and this will be an aim of future work. Chipped stone materials from the Summer 2013 season at Shimshara will also be recorded and studied in the future.

Chipped stone from Bestansur Trench 10: some provisional comments

Considerable quantities of chipped stone tools and debitage were recovered during excavations in Trench 10 in Summer 2013. Upper mixed levels of the trench contained large numbers of Neolithic bullet cores and debitage, not in primary contexts but clearly indicative of large-scale chert-knapping at some location in the general vicinity. From secure Neolithic contexts, there will be excellent scope to compare and contrast the assemblages from a range of spatial contexts, including external spaces vs internal spaces, but detailed recording of these assemblages remains to be carried out.

At a qualitative level, we can provisionally state that external surfaces and occupation deposits contain high amounts of chipped stone tools and debitage, with unretouched blades especially dominant. There are also large numbers of serrated and denticulated blades, including a number of chert blades with clear traces of sickle sheen and sometimes also with traces of a black fixative used to attach the blade to a haft. There appears to be on site working of both chert and obsidian, as attested by cores and knapping debris.

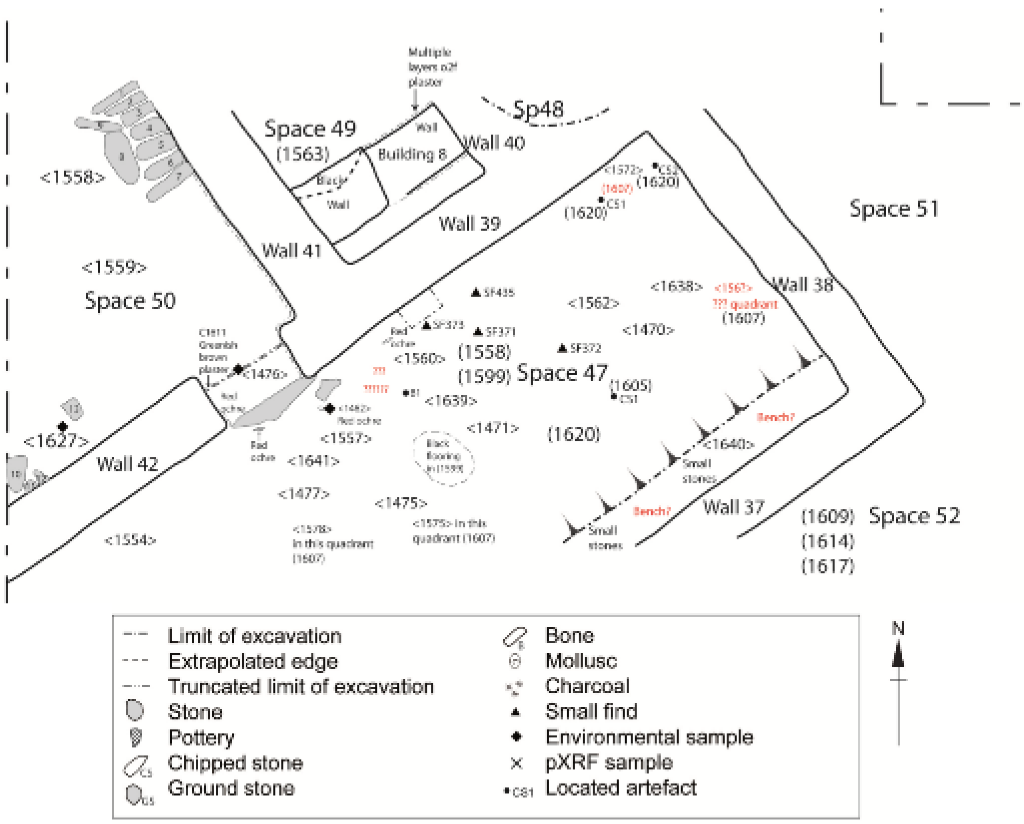

Figure 9.1. Trench 10, Building 5, Space 47, Context 1620 plan.

From internal spaces in Building 5, there are far lesser quantities of chipped stone tools and debitage. But some distinctive chipped stone finds were made in Space 47, Context 1620, excavation of a thin whitish floor and underlying packing (Fig. 9.1). Apart from small quantities of chips and flakes, a total of nine tools were found *in situ* in these deposits, as detailed in Table 9.1. The wide range of tools from Context 1620 is quite striking, including blades (of chert and obsidian), a sickle blade with sheen and fixative staining (Fig. 9.2), a thumbnail scraper, a flake scraper and an awl or point. This range of tools suggests that multiple activities were taking place within Space 47 and/or that tools for such activities were stored or deposited in Space 47. The two long obsidian blades, CS1 and CS2, are especially notable, found in close proximity in the northern corner of Space 47 (Fig. 9.1). These blades had clearly been struck from the same nodule and both had snapped, perhaps during knapping or use (Fig. 9.3).

Tool no.	Context	Tool type	Material	Colour	Comments
4809	1620	awl/point	chert	green/brown banded	broken both ends
4810	1620	flake scraper	chert	mid grey	complete
4811	1620	thumbnail scraper	chert	dk grey	complete?
4812	1620	blade	chert	mid grey	complete
4813	1620	sickle blade fragment	chert	pale grey w dk mottling	fine sickle sheen both faces of one edge, traces of staining of fixative on opposite edge. NB sickle sheen blades often made of this chert
4814	1620	blade frag	obsidian	dk grey	mid section, v fine bladelet
4815	1620	blade frag	obsidian	dk grey	mid section
4816 CS1	1620	blade	obsidian	grey	complete but found in two pieces, adjacent, ancient break. Long curving blade, tapering to point at distal end, probably broken during knapping and left at side of room, close to CS 2.
4817 CS2	1620	blade	obsidian	grey	complete but found in two pieces, adjacent, ancient break. Long curving blade, tapering to point at distal end, probably broken during knapping and left at side of room, close to CS 1.

Table 9.1. Chipped stone tools from Building 5, Space 47, Context 1620.

Future plans include the full recording of all chipped stone materials from all contexts of Trench 10 so that spatial and quantitative analyses can be conducted in the near future.

Figure 9.2. Tool 4813, chert blade with sickle sheen.

Figure 9.3. Tools 4816 CS1 and 4817 CS2, obsidian blades.

pXRF of obsidian and chert: research context and rationale

The research conducted during the course of the Summer 2013 field season continued investigations into the identification of obsidian and chert raw materials through portable X-ray fluorescence analysis. The consistent principal chemical composition of obsidians, in conjunction with the unique combination of trace elements at each source, renders them ideal for source identification. Furthermore, Bestansur is located at least 500km from the nearest suitable obsidian sources, thus illustrating far-reaching networks across the Neolithic landscapes. Preliminary results from analyses conducted during previous seasons has indicated at least two, possibly three, obsidian sources. The primary source for raw materials transported to Bestansur is Nemrut, Lake Van, from where at least 99% of the obsidian was transported. This material is found in the form of cores and debitage, indicating the working of Nemrut obsidian on-site. Furthermore, the obsidian tools from Zarzi and Shimshara may also be attributed to the same source. In contrast, three clear obsidian blades have been recovered from Bestansur, which relate to non-Nemrut sources. The difficulty in identifying obsidians from sites in Iraq has been highlighted by Carter *et al.* (forthcoming). This report revisits the identification of these unusual blades.

Cherts are represented by far more variation in their composition, occurring throughout the local geology, and with chert nodules littering the landscape, as observed during the course of the Zarzi Survey in January 2013. Substantial chert sources are known to exist in the high peaks of the Central Zagros, but travel restrictions to the Iraq-Iran border prevent further source analysis at this time. Analysis of cherts is therefore restricted to the characterisation of groups of material and identification of significant patterns of variation. These include the analysis of black cherts, which appear to imitate the obsidian tools. A further analysis has been integrated into this framework, examining the residues on sickle blades, including the sickle sheen along the serrated blade edge and the dark residues along the length of the blade from hafting.

Research aims and objectives

Following research conducted over the course of the previous seasons, a series of key questions remain regarding the composition of the chipped stone assemblage. This phase of the study aims to answer key research questions:

- Is it possible to identify the non-Nemrut obsidians to a source?
- Are the non-Nemrut obsidians featured in the earlier levels at Bestansur?
- Do the traces of sickle sheen correspond with the preliminary findings for identification?
- Is it possible to identify more sickle blades from the same chert source?

The data set

During the course of the season, a total of 25 chert and obsidian tools with analysed (Table 9.2). These include six obsidian tools and 19 chert tools. Tools for pXRF analysis were selected during the processing of lithics by R. Matthews and G. Ahadi. No clear obsidians were identified. Obsidians were selected on the basis of tool form: Çayonu tools, a pierced blade from Shimshara and two identical long obsidian blades from the lower levels of Space47, which were each broken into two pieces (Tools 4816 and 4817). Cherts were selected on the basis of colours infrequently occurring in the assemblage. Chert blades with sickle sheen or residues and stains from fixatives, such as bitumen, were also selected for analysis.

Table 9.2. Chert and obsidian tools analysed by pXRF

Site	Trench	Context	Tool	Material	Tool type	Notes
BEST	10	1317	4946	Chert	Blade	Black
BEST	10	1405	5122	Chert	Sickle	
BEST	10	1405	5125	Chert	Blade	Stain
BEST	10	1405	5130	Chert	Sickle	Red
BEST	10	1405	5151	Chert	Core	Green
BEST	10	1405	5155	Chert	Core	Purple
BEST	10	1409	5176	Chert	Sickle	
BEST	10	1409	5335	Obsidian	Cayonu	
BEST	10	1409	5345	Chert	Blade	
BEST	10	1413	4972	Chert	Blade	
BEST	10	1413	4976	Chert	Sickle	
BEST	10	1413	4994	Chert	Sickle	
BEST	10	1534	4532	Chert	Core	White
BEST	10	1534	4534	Chert	Core	Honey
BEST	10	1534	4537	Chert	Drill	Cream
BEST	10	1534	4538	Chert	Point	
BEST	10	1534	4545	Chert	Blade	Sickle sheen
BEST	10	1534	4546	Obsidian	Cayonu	
BEST	10	1538	4783	Chert	Blade	Fixative
BEST	10	1620	4813	Chert	Sickle	
BEST	10	1620	4816	Obsidian	Blade	In 2 pieces
BEST	10	1620	4817	Obsidian	Blade	In 2 pieces
BEST	12	1526	5430	Obsidian	Cayonu	
BEST	13	1578	5424	Chert	Sickle	
SHIM	2	1658	221	Obsidian	Blade	Pierced

Methods and approaches

Analysis of all artefacts was conducted in accordance with the protocols established in Spring and Summer 2012 (Matthews & Richardson 2012; Richardson 2013a), to ensure consistency of results. The Niton XL3t GOLDD+ was run in 'Mining mode', with high, low and main filters operating for 20 seconds each, and the light elements analysed for 60 seconds for all samples, with the exception of the reanalysis on Tools 374, 1076 and 2051, which was conducted in 'Soils mode' (see below for further details). The analyser was given time to stabilise to high temperature conditions at the beginning of each period of analysis and a full system check run. All readings were recorded in parts per million (ppm). NIST standard samples were run at the beginning and end of each period of analysis to check for drift. All samples were analysed in the tungsten-lined stand. All samples analysed using the 3mm spot are recalibrated where necessary, following the methodologies established in Spring 2013 (Richardson 2013b).

Obsidian

As stated in the previous archive report (Richardson 2013b, 150), the three tools from Bestansur displaying a non-Nemrut chemical signature have been reanalysed and further investigated in order to isolate the source of the obsidian.

The data used in this study has been downloaded from the online resource *Obsidatabase* (www.mom.fr/obsidienne/index.php), founded by B. Varoutsikos and C. Chataigner, which aims to "provide a platform for the study of obsidian distribution in the Near East and the Caucasus". The available data sheets for all sites have been compiled and the most commonly analysed elements selected for comparison. The elements used for identification purposes in Fig. 9.4 (Rb, Sr, Zr, Zn, Pb) were chosen on the basis of the availability and reliability of calibrated values. The following calibration processes have been applied to ensure the accuracy of the data:

- Analysis of NIST standard samples (NIM-G, SY3) in both 'Soils' and 'Mining' modes on the Niton XL3t GOLDD+
- Analysis of NIST standard samples (FER1, FER2, NIM-G, NIM-S, SY3) by the SAGES XRF (courtesy of F. Street)
- Comparison of NIST standard sample results with published values
- Elimination of inconsistently measured elements from analysis
- Calculation and application of averaged calibration values to most consistent elements for BEST samples

For the purposes of illustration, the values for both Meydan Dag and Bingol A (SE Anatolia) have been excluded. Both sources have exceptionally high zirconium values and are therefore not comparable with the Bestansur clear obsidian values.

The results demonstrate a positive correspondence between the Suphan Dag source material average values and the three Bestansur clear obsidian blades analysed (as considered in the previous archive report Richardson 2013b, 150). Under the title 'Prehistoric use', the *Obsidatabase* site states:

> "The Süphan Dag obsidians seem not to have been used in the Prehistory, which could be due to their porphyritic texture and to their poor quality for knapping.
>
> Only one publication (Fornaseri *et al.* 1975-1977) attributes some artefacts from Arslantepe, a chalcolithic site near Malatya (Turkey), to this source. The analytical results are not published; therefore it is not possible to check the chemical signature of these artefacts." *Obsidatabase* 2014

In more recent years, excavations at Tell Nader, on the fringes of modern Erbil, have recovered "translucent purple-grey obsidian", four samples of which have been analysed with EDXRF (Carter *et* al. forthcoming). Dating to the Late Ubaid/Early Uruk ($5^{th}/4^{th}$ millennium BC), these may tally with the results from late Chalcolithic Arslantepe. The chemical correlations between Bestansur and the Suphan Dag material does raise questions as to whether this source could be supplying to the Central Zagros from an earlier period. Whereas Tool 1076 (Trench 10) and Tool 2051 (Trench 11) are from mixed contexts, Tool 374 comes from a well-stratified Neolithic mollusc lens in Trench 4 (C1069). Chalcolithic activity around the village of Bestansur is known from the presence of a Chalcolithic mound c.500m from the Neolithic site of occupation. Although this activity could provide an explanation for the blades present in the mixed contexts, Tool 374 in Trench 4 does not support this argument. A case may be made on the back of this evidence for Suphan Dag playing a role in obsidian supply from the PPNB onwards. However, the possibility of hitherto unidentified obsidian sources bearing similar chemical signatures cannot be ruled out. Carter *et al.* (forthcoming, 17) observed:

> "characterisation studies of Iraqi and Iranian [obsidian] have almost always generated data from artefacts that could neither be matched to central or eastern Anatolian sources. In these cases the likelihood is that either (a) not all pertinent Anatolian obsidian was included in the analyses, (b) the artefacts were in fact made of obsidian from other regions, likely either those located in Armenia, for which we have an

increasing number of recent studies (Blackman et al 1998; Cherry et al 2010; Chataigner et al 2003), or from northern Iran, whose sources remain largely unexplored (though see Niknami et al 2010)".

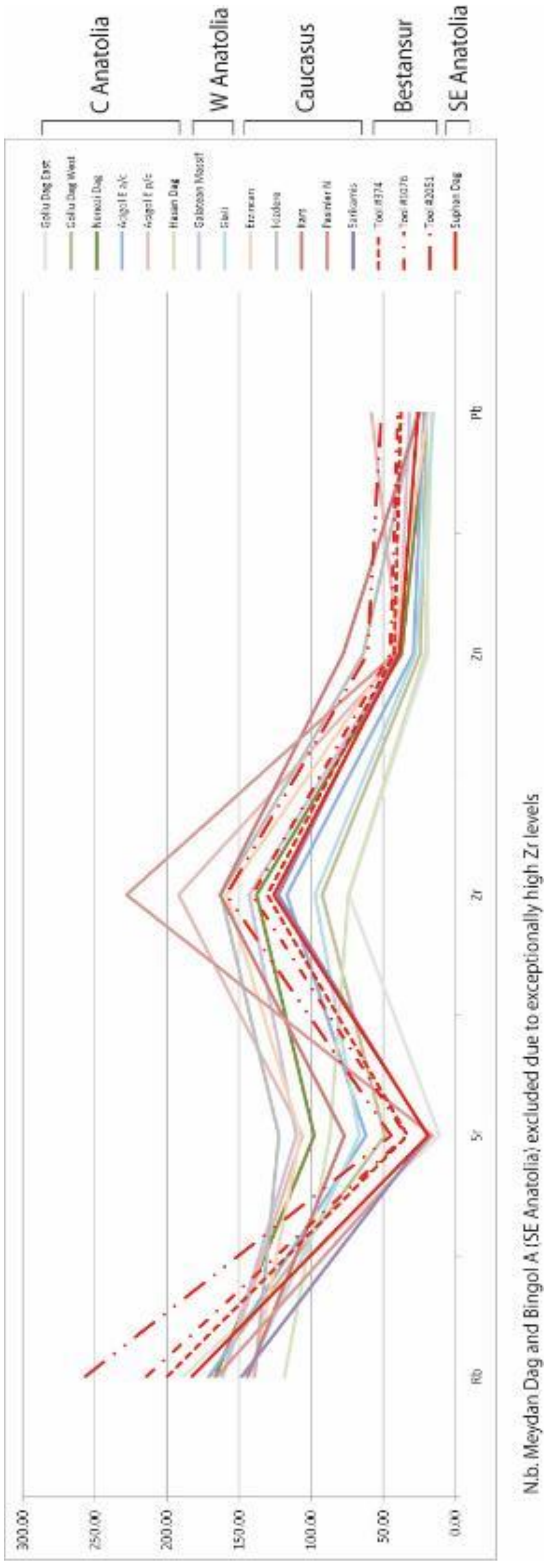

Figure 9.4. Obsidian sources compared with Bestansur Tools 374, 1076 and 2051

A sample of six obsidian tools were analysed during the Summer 2013 season, five from Bestansur and one from Shimshara. All six fit with the classic Nemrut profiles observed across the majority of tools from these sites (see this contrasted with the likely Suphan Dag tools below, Fig.9.5).

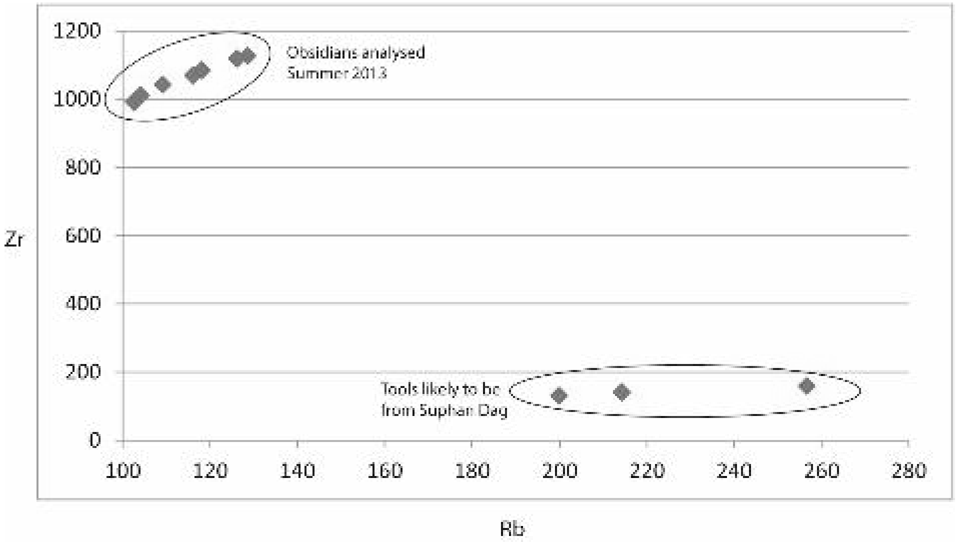

Figure 9.5. Comparison of pXRF analysed Zr and Rb values for Bestansur obsidians

Chert

Cherts are analysed according to major, minor and trace elements. However, at this stage the analysis of cherts is not anticipated to lead to the identification of sources. Field observations, conducted during the Zarzi Survey in January 2013, have highlighted the presence of abundant nodules of a wide range of stone materials evident across the river valleys, as commonly occur in areas of limestone. The location of Bestansur, in the foothills of the Zagros Mountains, along which the Iraq-Iran border runs, may hinder chert source investigation due to travel restrictions.

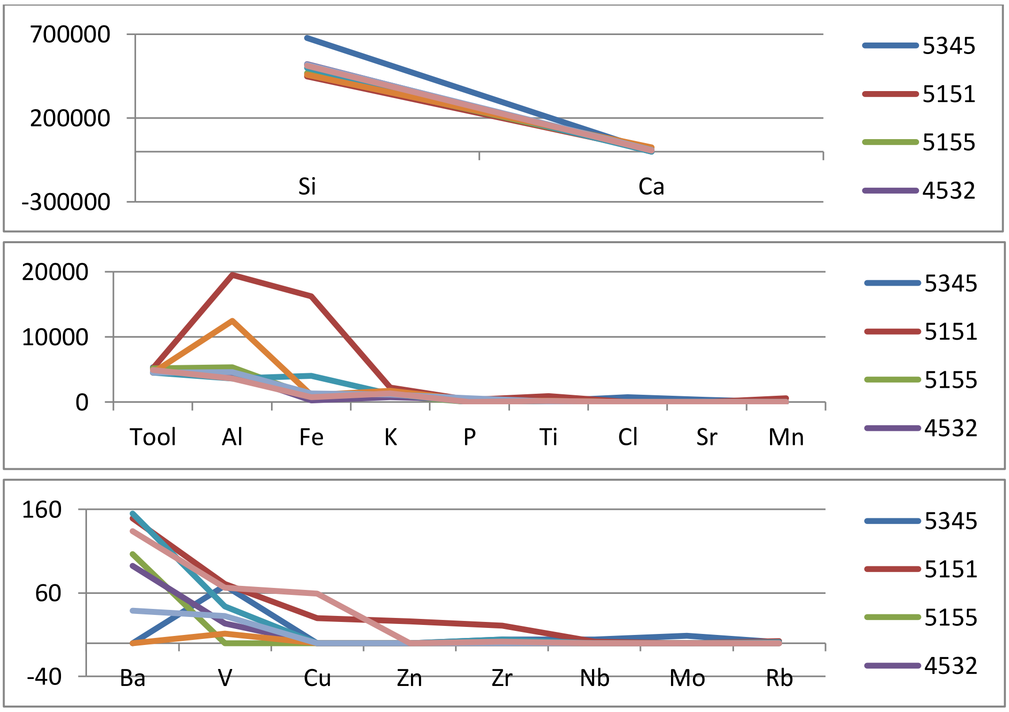

Figure 9.6. pXRF analysis of cherts by major, minor and trace elements (ppm)

Sickle sheen results

To support the data collected in Spring 2013, further analysis of blades with sickle sheen and hafting residues/stains were conducted (Table 9.1), in order to corroborate the correlation of elemental traces detectable by pXRF analysis.

The results, which compare the chert composition based on the average values from the analysis of the dorsal and ventral sides of the blades, with focussed readings from the areas affected by sheen or staining (Figs 9.7 and 9.9). The results support the preliminary observations made in Spring 2013 (Richardson 2013b), that where sheen occurs, silicon and strontium values will be elevated by the plant residues, and calcium values depleted.

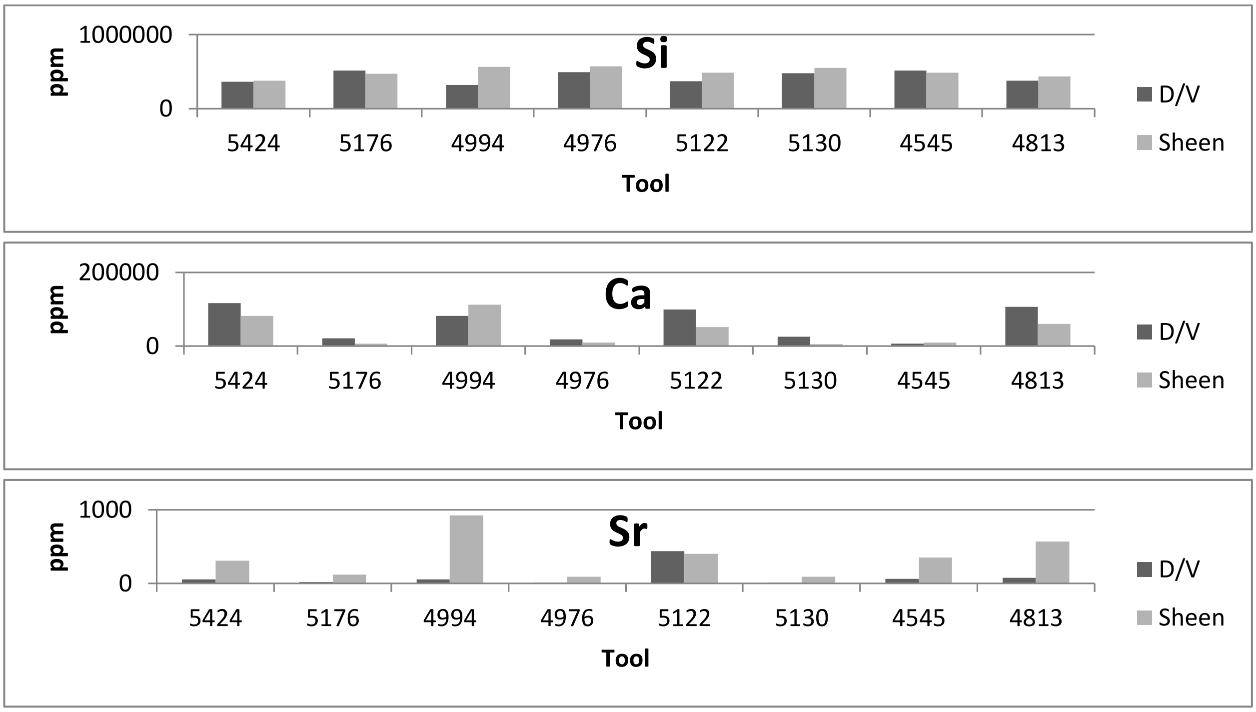

Figure 9.7. pXRF analysis of sickle blades with sheen (ppm)

Elevated strontium values may also be observed in the staining residues visible on the blade shafts, indicating a hafting of the blades with bitumen fixative. Sulphur traces largely mirror this pattern, but the chlorine values, whilst raised, are not so prominent. One exceptional set of readings, for Tool 4994 (C1413, T10), combine elevated calcium and very high strontium in the sheen, with greatly inflated chlorine in the hafting residues. The blade was excavated from C1413 in Trench 10, along with Tool 4976, which has borne more typical elemental readings. It may be that the limestone concretions along the length of Tool 4994 interfered with the composition.

Figure 9.8. Tools 4994 and 4976, both from C1413, the deep sounding within Trench 10

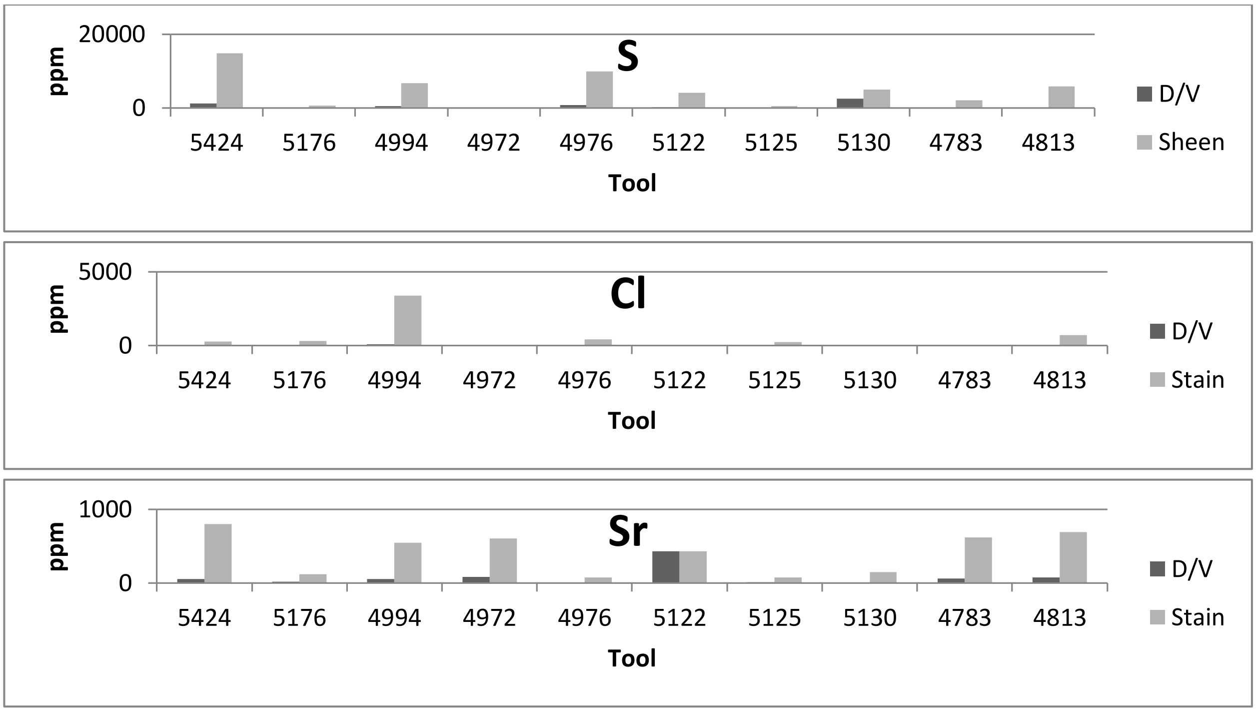

Figure 9.9. pXRF analysis of sickle blades with hafting residues (ppm)

Chapter Ten: 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 Summer 2013 field season at Bestansur and Shimshara 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 2013 Summer season, a total of 135 artefacts were assigned small find numbers. These artefacts were catalogued, photographed and drawn, ready for storage at the Sulaimaniyah Museum, and future integration into their collections.

From Bestansur, 105 artefacts were selected from a total of 11kg of bone, 43kg of pottery, 3kg of fired clay, 4.5kg of chipped stone and 38.5kg of ground stone, as having specific cultural significance. From Shimshara, 30 artefacts were selected from 6kg of bone, 1.5kg of pottery, 10kg of fired clay, 1.5kg of chipped stone and 10.5kg of ground stone. 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.

Methods and approaches

In the field, SF numbers were assigned to artefacts during excavation, through heavy residue processing and by other specialists conducting analysis (e.g. worked bone was highlighted by RB during the zooarchaeological analysis). Each find has been catalogued, described, illustrated, photographed and is now held at the Sulaimaniyah Museum, along with copies of the catalogues. Where appropriate, pXRF analysis has been conducted to identify and compare materials used for the manufacture of portable material culture. The pXRF analysis methods applied to the chipped stone tools have been applied here (see Chapter 9).

Results to date

Worked bone

From Bestansur, 40 items of worked bone were identified, 15 of which pertain to the processing of the Spring 2013 finds. Work at Shimshara yielded a further 16 pieces of worked bone.

The new phase of excavation in Trench 10 produced 15 pieces of worked bone, 11 of which were from the upper levels in C1538 and C1539 (comparable with C1412, C1414 and C1421 from the Spring season). These were external or entrance areas with sloping discard and surfaces (respectively).

A shaft fragment of a worked bone needle (SF418) was retrieved from the heavy residue sample taken for Wall 34 (C1546, SA1370). The pisé walls were largely clean of finds and it remains to be established whether the sample was contaminated or the walls were constructed using materials already containing occupation debris. Bone working debris is commonly found across the external areas excavated for Trench 10 (for example SF420 from C1554, Space 51). A further (burnt) bone needle fragment was located in C1606 (SF419). The two burnt fragments from Space 51 (outside the fire installation Space 48) appear to occurring in ashy discard and may relate to the removal of ash and debris from Space 48 for deposition beyond the walls. A single fragment of worked bone, the tip of a spatula, was located inside the walls, on the floor of Space 47 (SF435, C1620, Fig. 10.1).

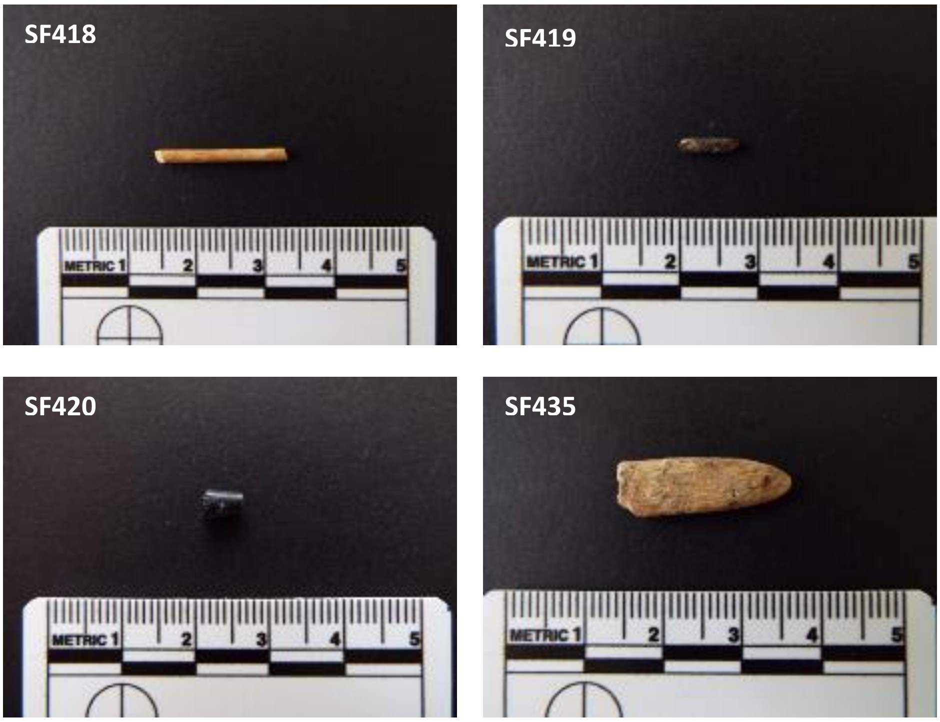

Figure 10.1. Worked bone from Trench 10

It is evident that significantly fewer worked bone artefacts were recovered from the earlier levels of Trench 10, relating to Buildings 5 and 8, than were observed in the previous season. On this basis, it is likely that bone-working activities in this area took place in the very latest stages of Building 5's occupancy or following its abandonment.

Eight pieces of worked bone were excavated in Trench 12, predominantly in the form of needles and points. These slender fragments were located in the repeated sequence of ash and packing, most frequently occurring in the packing levels (six in packing, one in ash). Two further fragments were recovered in Trench 13, from Spaces 45 (internal) and 24 (external). The latter (SF318, C1520) is a slender needle, similar to SF403 (C1523, T12) in shape, though larger in size. The deposition of needles in multiple contexts in the external spaces to the north of the mound argues a strong case for repeated activities, possibly pertaining to weaving or fabric working, in keeping with the apparent domestic nature of this area of the site.

Figure 10.2. Worked bone from Trenches 12 and 13

Excavations at Shimshara yielded 16 worked bone artefacts (eight from Trench 1 and eight from Trench 2). These include two fragments from the same bone needle (SF441 and SF433), recovered separately in the same context (C1661, T1) and refitted during post-excavation analysis with an ancient break (Fig. 10.3).

Figure 10.3. Complete worked bone needle from Shimshara

Among the artefacts recovered, a few key pieces should be highlighted. These include a bead worked from the shaft of a bird bone (SF442, T1, C1660), a pierced bone pendant with deliberately scratched surface (SF425, T2, C1633), an unusually shaped and marked bone tool (SF429, T2, C1633) and a flat fragment of incised bone (SF432, T2, C1658).

Figure 10.4. Worked bone from Shimshara

Stone
A wide variety of stone artefacts were recovered over the course of the season. Sixteen artefacts from Bestansur and five from Shimshara will be covered here. The ground stone material will be covered in further detail in the next archive report by D. Mudd. These include: stone bolas balls (SF316, SF366, SF440), stone bowls (SF378, SF444) and grinding pestles and mortars (SF368, SF369, SF449). It should be noted that the locations of SF369 and SF449 are of particular significance. The bell-shaped muller (SF369) was recovered from Space 47 in association with red ochre. SF449, a perfectly circular, straight-sided mortar, was located in the centre of Space 48, in the middle of multiple layers of burning. From the same context, a complete polished stone macehead was recovered (SF450), made from a rich brown stone with a brilliant yellow seam running through.

Figure 10.5. Stone artefacts from Trench 10

From the entrance to Building 5, five stones were located lining the walls, four to the east and a single stone to the west. The stone to the west is SF357, a large stone with a complex design of incised lines and dots (Fig. 10.6).

Figure 10.6. Incised stone from Trench 10 (SF357)

A single stone tool (SF326), made from alabaster, was found in Space 42, the small space to the southwest of Building 5. The small hand-tool tapers to a blunt point, possibly for retouching chipped stone (see gypsum alabaster tools SF16 & SF25, for similar technology, and also black marble tool, SF188).

Four stone tokens were recorded, which may be comparable with the clay token assemblage (discussed below). Two very similar tokens were observed in the upper levels of Trench 10 (SF337) and Trench 13 (SF351). The former is made from a polished dark ferrous stone, the latter from a limestone. These sub-spherical polished stones with flattened bases bore identical markings in the form of a single bisecting line, deeply incised from the base to the apex. On each token, a further 90 degrees around the base, a second short incised line may be observed. Parallels are yet to be identified. Space 47 of Building 5 contained a further ferrous stone, which is acorn-shaped and appears to have been worked (SF371), as well as an irregular stone disc with central perforation (SF372), similar to those seen in Trench 7. A single polished pebble was located in the threshold between Space 47 and Space 50 (SF373). Oval in shape, the pebble bears subtly incised markings at a right-angle to the lower edge, possibly indicative of the bifurcation of legs.

Figure 10.7. Stone tokens from Bestansur

In Trench 12, two sets of pierced stones were recovered, representing two depositions of broken possible fishing net weights (SF317, SF321). Both sets bore similar patterns of deliberate breakage, including strike points on stones, rather than natural fracture at the weakest points. The consistent and methodical destruction may indicate the deliberate ‘killing’ of objects prior to deposition. At least two methods for the manufacture of the weights may be observed in the assemblages (although neither is exclusive to a single assemblage). Variations include the drilling of the perforation from one or both sides, trapezoid or irregular shaping, and nibbling to thin the edges as opposed to smoothed rounded curves.

Figure 10.8. Fishing-net weights from Trench 12

Adornment

Beads

From Bestansur, 27 Neolithic bead small finds were recorded. Whereas beads have, for the most part, been recorded individually, a number of bead groups, possibly pertaining to necklaces have been assigned a single SF number. A total of 162 individual beads were recovered during the course of the field season.

Only four of the recovered beads were manufactured in stone: two from Trench 13 (SF315, SF328), one bead blank (SF437) and one complete bead (SF451) from Trench 10. SF315 is a small serpentine bead and SF328 made from carnelian. The former may well be sourced from serpentine deposits in the Zagros, while the latter must have travelled further, possibly from the Iranian deposits in the Elborz mountain range.

Figure 10.9. Stone beads from Bestansur

The exceptional flat bead from Trench 10 is perhaps better characterised as sard or chalcedony rather than carnelian, being dark brown in colour and opaque. Chemical analysis of both SF328 and SF451reveals both materials have a remarkably pure (and similar) composition, over 99% pure SiO2 (Table 10.1). However, minor differences in the trace elements indicate that different sources are likely to be responsible for the raw materials. SF451 is a 'flat' or 'tabular' type bead, commonly seen across the Fertile Crescent in the eighth millennium BC, comparable to examples from Jarmo and Nevali Çori (Kozlowski & Aurenche 2005: 5.1.1).

Table 10.1. pXRF analysis of carnelian/sard (%)

Sample	SiO2	Ba	Ca	K	Fe	Ti	V
SF328	99.57	0.00	0.19	0.10	0.05	0.01	0.00
SF451	99.80	0.06	0.06	0.02	0.03	0.01	0.01

The sard bead, SF451, was recovered from C1623 in Space 50, in conjunction with human remains and SF385, a group of four mollusc beads and two dentalium barrel beads (Fig. 10.11). A further seven small finds were recorded from Space 50, comprising of beads made from molluscs (71), dentalium (44) and crab claws (4), totalling 119 beads. This is the largest collection of beads recorded at Bestansur. The beads were in association with the remains of at least three individuals, indicative of adornment of the dead or deposition with one or more individuals, possibly in the form of necklaces. Whereas molluscs and crabs are abundant at Bestansur, dentalia (also referred to as *scaphopoda* or tusk shells) are marine creatures and may have been transported from either Mediterranean sources or the Persian Gulf. Consequently, the beads are building a view of wide-ranging material networks in operation and integration with type styles that span the Fertile Crescent.

Figure 10.10. Groups of dentalium, mollusc and crab claw beads

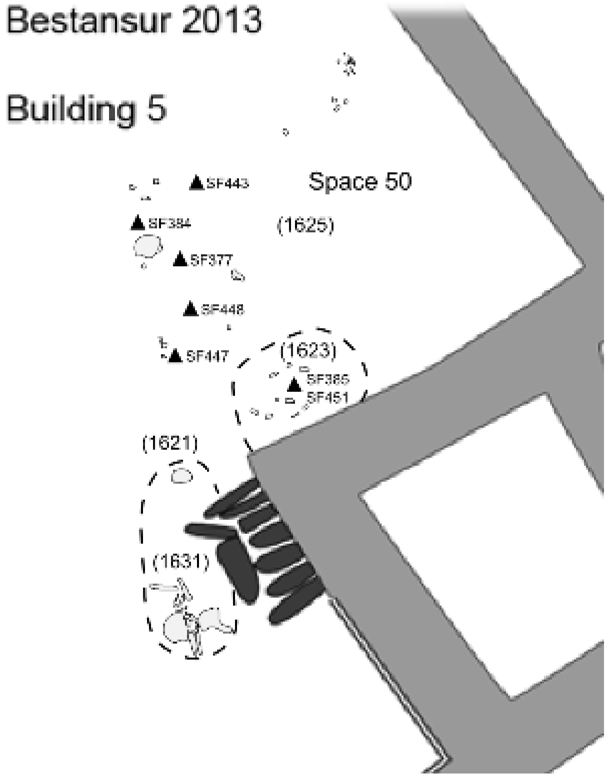

Figure 10.11. Location of SFs in Space 50, Trench 10

Trench 13 yielded only a single dentalium bead, whilst the layers of ash and packing in Trench 12 contained 14 bead small finds (32 dentalium beads, including a group of 15 – SF376; 1 shell bead). The red and cream dentalium beads were all of disc and barrel types, comparable with those found in Space 50 of Trench 10. The single shell bead, rather than the typical mollusc type seen, appears to have been an attempt to imitate the cream dentalium disc bead, using a mollusc shell as substitute.

Two fragments of small, white stone, disc beads were recovered in Trench 1 at Shimshara, similar to that recorded from section-cleaning at Shimshara in 2012 (SF138, Mortensen 1970: fig. 42.n-o).

Bracelets
A single bracelet fragment was located during excavations at Bestansur (SF336), from C1528 in Trench 12, in association with the dentalium beads. The flanged alabaster bracelet fragment is comparable to that

found in the upper, mixed levels of Trench 10 (SF187, see Spring 2013 Archive Report), although the upper and lower edges of SF336 are flattened rather than tapered, as they are on SF187. The type is distinctively Neolithic, with parallels to be found in polished marble at Maghzaliyah (Bader 1993, 37, fig.2.25:23-4) and Aşıklı Höyük. The latter was made from obsidian and situated halfway between the sources at Nenezi Dağ and Göllü Dağ, although the obsidian has not yet been analysed (Astruc *et al.* 2011, 3416). In spite of the difference in material, the technological traces for manufacture look similar on this rare type of bracelet, suggesting that these may be travelling at least from Northern Iraq and possibly from as far as Eastern Anatolia.

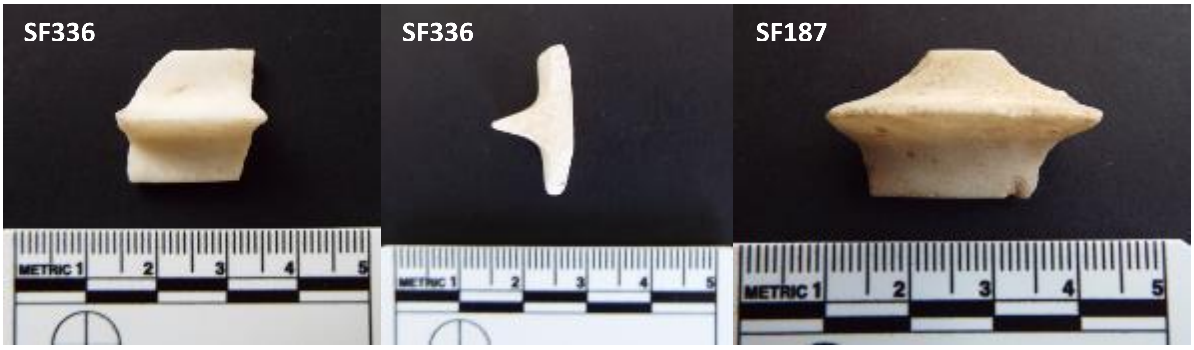

Figure 10.12. Flanged alabaster bracelets from Trench 12 (SF336) and Trench 10 (SF187)

Six stone bracelet fragments were recorded from Shimshara, similar to those located in the section cleaning (Summer 2012 Archive Report). These were evenly divided between the trenches. Notably, the three fragments with lenticular section pertain to Trench 1, and those with sub-circular or sub-rectangular section to Trench 2.

Figure 10.13. Stone bracelet fragments from Shimshara, Trench 1 (upper) and Trench 2 (lower)

Clay

Six clay tokens were identified over the course of the field season, five from Trench 10 and one from Trench 13, in a variety of shapes. Traditional token forms are represented by SF329 (cone) and SF452 (ball); squashed or nullified forms by SF334 and SF335. Less commonly seen forms include SF370, which appears to be bladder-shaped, and SF332, which is almond-shaped.

Figure 10.14. Clay tokens from Bestansur, Trench 10 and Trench 13

Three additional clay artefacts were recovered from the Neolithic levels in Trench 10, including an unfired clay disc with concave surface (SF333, fragmented on excavation), located in C1550 with the squashed/nullified tokens SF334 and SF335. This context was a layer of packing underlying Walls 31-34 and also included Feature 12, a group of smashed ground stones, indicating a pattern of destruction and deposition in this level between Building 8 and Building 5. A further, large, lightly-fired clay artefact was retrieved from Space 51 (SF359). Multi-facetted and excavated in five fragments, the tapering form is unidentifiable, as is that of the clay fragment from external Space 53 (SF397). A small, eye-shaped piece of pink clay (SF342), with central perforation was excavated from Trench 12 (C1514). The clay is reminiscent of that used for the clay 'miniature mask' located in Trench 10 during the Spring 2013 excavations (SF248), as opposed to the darker clays commonly used in the Bestansur artefacts. Two further unidentifiable fragments of shaped clay were recovered from Trench 13.

Figure 10.15. Clay objects from Bestansur, Trench 10 and Trench 13

Post-Neolithic

Post-Neolithic finds from disturbed and surface levels at Bestansur indicate later activities, such as a clay spindle whorl (SF322) and beads (SF319, SF320, SF327) from Iron Age occupation at the site. Modern disturbances include fragments of ottoman pipes in Trench 10 (SF311, SF312, SF314) and a 1917 Indian Quarter Anna (SF310).

Figure 10.16. Indian Quarter Anna, 1917 (SF310)

Table 10.2. Catalogue of small finds

SF	Site	Trench	C#	Item	Description	Material
310	BEST	10	1533	Coin	Copper coin, minted in 1917.	Copper
311	BEST	10	1534	Frag of Ottoman pipe	Fragment of the head of a small ceramic pipe, probably Ottoman. Burnished surface with decorative small, rectangular impressions.	Clay
312	BEST	10	1534	Frag of Ottoman pipe	Bowl and part of stem of Ottoman pipe.	Clay
313	BEST	10	1534	Iron ring	Corroded iron ring, non-decorative. Date uncertain, possibly modern.	Iron
314	BEST	10	1535	Frag of Ottoman pipe	Large bowl fragment of Ottoman pipe	Clay
315	BEST	13	1515	Stone bead	Small, green, irregular lenticular bead with perforation.	Stone
316	BEST	12	1512	Stone ball	Spherical stone, with pitting suggestive of use as shot. Heavy limestone concretions on one side.	Limestone
317	BEST	12	1514	Group of worked stones	Group of >30 stone fragments, containing numerous pierced stones, possibly weights.	Limestone
318	BEST	13	1520	Bone needle	Three fragments of a slender bone needle (one ancient break, one modern). Circular section, tapering gently towards flat head, and more steeply to rounded, blunt point.	Bone
319	BEST	10	1534	Large clay bead	Large, irregular, sub-cylindrical clay bead, with moulded, off-centre perforation. Clay is fine, smooth (possibly from wear) and fired.	Clay
320	BEST	12	1518	Small blue bead	Small, blue, cylindrical bead, with slight curvature and central perforation.	Stone
321	BEST	12	1523	Group of worked stones	Group of >11 fragments of pierced, unpierced and partially pierced flat stones	Limestone
322	BEST	12	1571	Clay spindle whorl	Complete, bulb-shaped clay spindle whorl, with moulded central perforation. Clay is buff, coarse and low-fired, with occasional large organic voids.	Clay
323	BEST	12	1571	Bone with chipped stone inside	Fragment of bone with chert, chipped stone tool embedded inside. Bone fractured on removal, to reveal tool along shaft.	Bone
324	BEST	10	1405	Worked bone	Small, tapering fragment of worked and polished bone, with lenticular section.	Bone
325	BEST	10	1405	Worked bone	Small fragment of worked and polished bone, with lenticular section.	Bone

SF	Site	Trench	C#	Item	Description	Material
326	BEST	10	1540	Stone tool	Drop-shaped gypsum alabaster hand-tool, shaped to fit between thumb and forefinger. Tapering to a blunted point. Possibly for chipped stone retouch.	Alabaster
327	BEST	13	1572	Stone bead	Barrel bead made from highly polished dark grey with black ?marble.	Stone
328	BEST	13	1575	Carnelian bead	Lozenge-shaped, amber-coloured carnelian bead. Central perforation is 1mm wide, drilled from either end (visible through translucent material). Bead has trapezoid section and is crudely shaped with flaws in fabric and surface damage.	Carnelian
329	BEST	10	1548	Clay token	Small, conical clay token, with convex sloping up to point. Base is slightly concave, from flattening with finger. Clay is brown-black, possibly burned. Two scars are present on the surface, either from organic temper or a deliberate marking process.	Clay
330	BEST	12	1523	Dentalium bead	Small, dark red dentalium bead.	Dentalium
331	BEST	12	1523	Bone needle	Fine, polished bone needle tip. Broken from shaft.	Bone
332	BEST	13	1576	Clay object	Almond-shaped clay object, possibly a token, made from hard-fired, dark brown clay, with smoothed surface. Some surface scars and concretions.	Clay
333	BEST	10	1550	Clay object	Fragments of an unfired clay disc, disintegrating on recovery. Clay is moulded to form a simple disc/dish shape, with concave upper and convex lower.	Clay
334	BEST	10	1550	Clay token	Small clay token, between squashed-cone and elevated-button in shape, with central peak and minor protrusions on opposing sides. Base is slightly concave, where flattened.	Clay
335	BEST	10	1550	Clay object	Small clay shape, possibly a squashed or nullified token or seal. Found in association with SF334. May be a partial fragment of a larger artefact. Shape is irregular, with only one smooth side.	Clay
336	BEST	12	1528	Bracelet fragment	Fragment of a flanged alabaster bracelet. Uniform thickness in section, with flat edges and wide, sharply tapered central flange, terminating in peak.	Alabaster
337	BEST	10	1553	Stone token	Small, rounded stone object, similar to button token in form, with bisecting line incised into surface, wrapping around base and apex. Formed from black stone.	Stone
338	BEST	10	1412	Worked bone	Fragment of worked bone point or needle. Shaft is broken at both terminals and along length.	Bone
339	BEST	10	1412	Worked bone	Two fragments of worked bone with ancient break. Shaft has concave grooves running along length on either side. Broken at both terminals.	Bone
340	BEST	12	1514	Dentalium bead	Small, dark red dentalium disc bead, with central perforation	Dentalium

SF	Site	Trench	C#	Item	Description	Material
341	BEST	12	1514	Bead fragment	Small, dark red, dentalium bead barrel-bead fragment, with central perforation along length.	Dentalium
342	BEST	12	1514	Clay object	Eye-shaped clay object with deliberately moulded central perforation.	Clay
343	BEST	10	1409	Worked bone	Discard from bone working. Saw-and-snap marks visible at terminal.	Bone
344	BEST	9	1356	Bone needle	Fragment of very fine bone needle shaft. Tapered with circular section.	Bone
345	BEST	9	1347	Worked bone	Shaft section of a sheep-sized right tibia, with deep, curved groove cut/worn (?) at an angle from cortical bone.	Bone
346	BEST	12	1523	Dentalium bead	Small, cream dentalium disc bead, with central perforation	Dentalium
347	BEST	12	1524	Dentalium bead	Small, cream dentalium disc bead, with central perforation	Dentalium
348	BEST	12	1526	Dentalium bead	Small, cream dentalium disc bead, with central perforation	Dentalium
349	BEST	12	1526	Dentalium beads (4)	Three cream dentalium disc beads (3mm) and one larger (4mm) dark red dentalium disc bead.	Dentalium
350	BEST	12	1526	Shell bead	Possible shell imitation of cream dentalium disc beads. Surface is angular, where shaped, and central perforation is much larger (>2mm). Wall is <0.5mm thick.	Shell
351	BEST	13	1574	Stone token	Small, rounded stone object, similar to button token in form, with bisecting line incised into surface, wrapping around base and apex. Formed from pale limestone.	Stone
352	BEST	13	1578	Clay object	Curved clay shape, apparently intentionally formed, with groove impressed close to one of the broken terminals.	Clay
353	BEST	9	1357	Worked bone	Polished worked bone (possible spatula?) - probably from a cattle-sized rib	Bone
354	BEST	9	1357	Worked bone	Fragment of worked bone with a rounded edge.	Bone
355	BEST	12	1528	Dentalium bead	Small pink-orange disc bead, possibly dentalium, made to similar size as red dentalium beads (see SF205 for fabric and SF350 for form).	Dentalium
356	BEST	13	1577	Dentalium bead	Small, very thin, pink-orange disc bead, possibly dentalium or stone. Made in similar size and style as read dentalium beads, potentially imitative.	Dentalium
357	BEST	10	1539	Incised stone	Large, incised stone from entrance to walled complex (later Neolithic phase). Stone has a smoothed (ground?) upper surface, slightly concave at centre. Incisions vary from deep and repeatedly scored (errors evident), to light, single-stroke additions.	Stone
358	BEST	13	1520	Clay object	Two small fragments of a lightly-baked clay object, found in North-facing section of Trench 13. Shape is too abraded to identify original form. Clay is dark brown and coarse, with few inclusions.	Clay

SF	Site	Trench	C#	Item	Description	Material
359	BEST	10	1554	Clay object	Clay object in five fragments, retrieved from dry-sieving. Object is narrow at one end, expanding towards the rear, with two parallel upper ridges, based on re-assembly of two fragments. Three fragments not reconstructed.	Clay
360	BEST	12	1528	Three dentalium beads	Three small, cream-coloured dentalium disc beads, with 1mm central perforation.	Dentalium
361	BEST	12	1526	Bone needle	End fragment of a very fine, polished bone needle, only 1.6mm thick, with drilled perforation less than 1mm in width. On one side, minor scarring is present, where drilling has fractured the surface. Needle is broken towards the point.	Bone
362	BEST	12	1526	Small bead	Small, red disc bead, possibly dentalium, with central perforation. Section is trapezoid; likely a cutting error, rather than intentional.	Dentalium
363	BEST	10	1538	Worked bone	Fragment of worked bone shaft	Bone
364	BEST	10	1409	Worked bone	Fragment of worked bone	Bone
365	BEST	10	1409	Worked bone	Fragment of worked bone	Bone
366	BEST	10	1554	Stone ball	Oblate spheroid ball, ground from pale grey (?lime)stone. Concretions obscure an otherwise smooth surface. Function not evident. Broken by pickaxe.	Stone
367	BEST	12	1528	Bone tool	Long, slender worked bone point (possibly an awl), with blunted tip, probably through usage, and broken terminal. Ovoid in section.	Bone
368	BEST	13	1582	Ground stone	Large pecked grinding stone/mortar, with concave upper and convex lower, to form dish with coarse surface.	Stone
369	BEST	10	1599	Ground stone 'muller'	Ground stone 'muller', with one fractured edge, but otherwise intact classic 'bell-shape'. Found in association with internal entranceway and red ochre deposits. Areas of possible ochre staining on surface.	Stone
370	BEST	10	1565	Clay object	Small, globular fired clay object. Shape possibly indicative of a pouch or container (of liquids?), with pointed base. Potentially a token.	Clay
371	BEST	10	1599	Stone object	Acorn-shaped ferrous stone, possibly naturally formed, although some faceting could indicate elements of deliberate shaping.	Stone
372	BEST	10	1599	Stone disc	Slightly irregular stone disc, with central perforation possibly drilled from one side. Stone appears to have been smoothed and polished. Residue in perforation retained for further analysis.	Stone
373	BEST	10	1605	Incised stone	Small, polished pebble, with markings incised on front and rear, suggestive of bifurcation of legs.	Stone
374	BEST	12	1529	Dentalium bead	Small, dark red dentalium disc bead with central perforation	Dentalium
375	BEST	12	1528	Dentalium bead	Small, dark red dentalium disc bead with central perforation	Dentalium

SF	Site	Trench	C#	Item	Description	Material
376	BEST	12	1528	Dentalium beads	Eleven cream and four dark red dentalium disc beads, with central perforation. Cream beads are 3mm x 1mm; red beads are 4mm x 1.5mm.	Dentalium
377	BEST	10	1625	Beads	37 mollusc beads, 4 red dentalium barrel beads, 5 white dentalium disc beads, 11 red dentalium disc beads and 1 crab claw bead	Shell
378	SHIM	2	1650	Stone bowl frag	Base and wall fragment of a limestone bowl	Stone
379	BEST	12	1525	Worked bone	Fragment of worked bone	Bone
380	SHIM	1	1661	Worked bone	Fragment of worked bone	Bone
381	SHIM	2	1650	Worked bone	Fragment of worked bone	Bone
382	SHIM	2	1652	Worked bone	Fragment of worked bone	Bone
383	BEST	10	1539	Worked bone	Fragment of worked bone	Bone
384	BEST	10	1625	Shell beads	Two dentalium disc beads (one red, one white), plus four mollusc beads	Shell
385	BEST	10	1623	Shell beads	Four small mollusc beads, plus 2 dentalium barrel beads	Shell
394	BEST	10	1412	Worked tooth	Fragment of worked tooth	Bone
395	BEST	10	1412	Worked bone	Fragment of worked bone	Bone
396	BEST	10	1412	Worked bone	Fragment of worked long bone with saw marks	Bone
397	BEST	10	1600	Clay shape	Clay fragment with circular, convex surface and fragmented rear, indicating partial remains of a larger artefact. Possibly a lug or other applied appendage. Elliptical in section.	Clay
398	BEST	10	1538	Worked bone	Fragment of worked bone	Bone
399	BEST	10	1538	Worked bone	Fragment of worked bone	Bone
400	BEST	10	1538	Worked bone	Fragment of burnt, worked bone, with more burning evident at wider, pointed end.	Bone
401	BEST	9	1350	Worked bone	Fragment of worked bone	Bone
402	BEST	10	1538	Worked bone	Fragment of worked bone needle shaft	Bone
403	BEST	12	1523	Worked bone	Worked bone with perforated end, likely the eye of a needle	Bone
404	BEST	10	1539	Worked bone	Fragment of worked bone with saw marks at one end and burning at the other	Bone
406	BEST	10	1539	Worked bone	Fragment of burnt sheep-sized long bone	Bone
407	BEST	10	1539	Worked bone	Fragment of worked bone. Blackened, with cut marks.	Bone
408	SHIM	1	1653	Worked bone	Fragment of burnt worked bone	Bone
409	BEST	10	1539	Worked bone	Fragment of worked bone	Bone
410	SHIM	1	1649	Worked bone	Fragment of worked bone point	Bone
411	SHIM	2	1652	Worked bone	Fragment of worked bone	Bone
412	SHIM	1	1649	Worked bone	Fragment of worked bone	Bone
413	SHIM	2	1658	Worked bone	Fragment of worked bone	Bone
414	SHIM	1	1649	Worked bone	Fragment of worked bone	Bone
415	BEST	12	1528	Worked bone	Fragment of worked bone	Bone
416	BEST	13	1580	Worked bone	Fragment of worked bone	Bone
417	BEST	10	1539	Worked bone	Fragment of worked bone	Bone
418	BEST	10	1546	Worked bone	Shaft fragment of worked bone needle	Bone
419	BEST	10	1606	Worked bone	Fragment of burnt worked bone needle	Bone
420	BEST	10	1554	Worked bone	Fragment of burnt worked bone	Bone
421	BEST	12	1528	Worked bone	Fragment of worked bone	Bone
422	SHIM	2	1636	Bracelet fragment	Marble bracelet fragment with sub-circular section.	Marble
423	SHIM	1	1634	Bracelet fragment	Small fragment of a marble bracelet.	Marble

SF	Site	Trench	C#	Item	Description	Material
424	SHIM	2	1636	Bone tool fragment	Shaft fragment of a polished, worked bone tool	Bone
425	SHIM	2	1633	Bone pendant	Small, rectangular bone pendant, with perforation drilled from either side of flat surfaces, towards one terminal. Striations visible across surface.	Bone
426	SHIM	2	1652	Bracelet fragment	Large fragment of a thick, marble bracelet, with sub-rectangular section. Modern break to produce two fragments.	Marble
427	SHIM	2	1658	Clay knob	Large clay knob, with flared, circular terminal, tapering to narrow join with ?vessel wall. Possibly a lid-handle.	Clay
428	SHIM	1	1653	Bracelet fragment	Small fragment of a marble bracelet, with lenticular section.	Marble
429	SHIM	2	1633	Bone tool	Bone tool with flared head and pointed tip. Shaft narrows from ovoid to roughly circular section, with notches for hafting. Numerous scars on one face of the head.	Bone
430	SHIM	2	1633	Stone tool	Pointed stone tool, in black/dark grey ?chert. Long shaft narrowing to a pointed tip and tapering to a rounded terminal. Striations along length on all sides. Sub circular in section, with slight faceting around circumference.	Stone
431	SHIM	2	1659	Stone bowl fragment	Thick, marble bowl fragment, with six incised parallel lines around circumference of vessel wall.	Marble
432	SHIM	2	1658	Incised bone	Flat bone fragment, narrowing to one edge, broken at others. Deep, parallel incisions on one face and light, roughly parallel scratches on opposing face.	Bone
433	SHIM	1	1661	Bone needle fragment	Shaft and tip of a thick bone needle, with possible burning towards eye (SF441). Circular section.	Bone
434	SHIM	2	1662	Bracelet fragment	Marble bracelet fragment with sub-rectangular section.	Marble
435	BEST	10	1620	Bone tool fragment	Tip of a flat bone spatula, with shaft curving towards a rounded point.	Bone
436	BEST	10	1621	Cylinder bead	White cylinder bead, flared and broken at one end. Parallel incised (?working) lines visible on areas of the surface; polished lustre on others. Made from crab claw.	Crab claw
437	BEST	10	1621	Bead fragment	Wide, rounded fragment of a possible stone, barrel bead-blank, with drilling incomplete and fracture along length. Abraded fracture suggests object is redeposited.	Stone
438	SHIM	1	1632	Bracelet fragment	Thin marble bracelet fragment with lenticular section.	Marble
439	SHIM	1	1634	Two pebbles	Two small, river-washed and polished pebbles. The larger (18mm) is ovoid, with oval section in pale grey limestone. The smaller (16mm) is dark grey, spheroid, with at least one elongated scar.	Stone
440	SHIM	2	1640	Stone bolas	Large and heavy stone bolas with pitting and scarring from impact(s).	Stone

SF	Site	Trench	C#	Item	Description	Material
441	SHIM	1	1661	Bone needle	Head and shaft of a thick, polished bone needle, with tip missing. Shaft is circular in section, flaring to a wide, flattened head. Eye is drilled from both sides, initially 3mm wide, and stepped to form 2mm wide perforation.	Bone
442	SHIM	1	1660	Bone bead	Bone cylinder bead, likely bird bone, with sawn terminals and pronounced ridged running along length.	Bone
443	BEST	10	1625	Crab claw bead	Crab claw bead with cut and smoothed terminals. Surface was striations/light grooves along length from smoothing. Core is hollowed to form tapering perforation along curved length.	Crab claw
444	BEST	13	1521	Stone bowl	Large base and wall fragment of a ground stone bowl, with damage to the lip. Full profile is present (c.6.5cm high).	Stone
445	SHIM	1	1664	Bead fragment	Fragment of a small, white stone disc bead (c.50%), with central perforation.	Stone
446	SHIM	1	1664	Bead fragment	Fragment of a small, white stone disc bead, with central perforation. Fractured at an angle.	Stone
447	BEST	10	1625	Bead fragment	Small, dark red cylinder bead, made from dentalium, with off-centre perforation.	Dentalium
448	BEST	10	1625	Crab claw bead	Crab claw bead with cut and smoothed terminals. Surface was striations/light grooves along length from smoothing. Core is hollowed to form tapering perforation along curved length.	Crab claw
449	BEST	10	1668	Ground stone	Complete, circular, limestone ground stone. Convex upper and concave lower (or positioned upside in context).	Ground stone
450	BEST	10	1668	Stone macehead	Complete, globular, pierced limestone macehead, with oblate profile.	Ground stone
451	BEST	10	1623	Flat red bead	Flat bead in pure red/brown stone, with nibbling around perforation and one percussion strike on each edge (fractures as chert). Traces of white impurity in otherwise pure material.	Carnelian
452	BEST	10	1667	Clay token	Small clay ball, carefully formed and lightly fired. Brown-black in colour. Likely a token.	Clay
454	BEST	10	1625	Beads	19 red dentalium barrel beads, 30 mollusc beads and 2 dentalium disc beads	Shell

Chapter Eleven: Preliminary investigations at Kani-e Rash

Kamal Rouf Aziz and Amy Richardson

K. Rouf Aziz alerted the CZAP team to the presence of archaeological remains on a development site near Zarayan, at Kani-e Rash. The team undertook section cleaning and sampling to assess the site.

The section is 1.85m high, with little other anthropogenic material evident throughout except for a few localised patches of baked clay. Modern construction activity has cut through the section, forging a path *c.* 2m in width, between the section and the road. Building structures are situated less than 2m from the edge of the section. No evidence for further archaeological remains was visible below the road surface. The human remains were at a depth of 1.2m.

Figure 11.1. K. Rouf Aziz working at Kani-e Rash

Preliminary observations revealed the presence of human bone compacted in fine layers and at least four clusters, belonging to at least three individuals. Bone was sampled at each cluster and from the loose spoil. Fragments of chert and obsidian tools were recovered from the section spoil, although no chipped stone was recovered in-situ. Clay samples were also recovered, for pXRF analysis and comparison with material from Bestansur.

Initial considerations of the quality of bone preservation, depth of deposits and associated finds indicate the presence of multiple inhumations, possibly Neolithic in date.

Figure 11.2. Compacted layers of bone in the section

Figure 11.3. Section at Kani-e Rash, with compact bone deposit and major cluster

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