ÇATALHÖYÜK 2012 ARCHIVE REPORT

ÇATALHÖYÜK RESEARCH PROJECT

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Archive Report 2012 compiled by Burcu Tung
Cover – Banu Aydınoğlugil looking at obsidian mirror. Photo by Jason Quinlan.

1. 2012 Season Review

Çatalhöyük is added to UNESCO World Heritage List

Figure 1.1 The Minister of Culture and Tourism visits Çatalhöyük after the UNESCO inscription. Photo Jason Quinlan.

On July 1 2012 the 21-member World Heritage Committee of UNESCO voted in St Petersburg to place Çatalhöyük on the World Heritage List. This was a major achievement resulting from years of work by the Turkish Ministry of Culture and Tourism at all levels from the Minister (Ertuğrul Günay) and Director-General (Murat Suslu) down to the Konya Museum (Yusuf Benli) and local officials. The impact of the inscription rather dominated our excavation season. In particular, we had a major press day when the Minister and local dignitaries visited and toured the site (Figure 1.1) and there was a considerable amount of press coverage.

Çatalhöyük is the only Neolithic tell site on the UNESCO List in the whole of the Middle East, and indeed there are few Neolithic or early prehistoric sites on the List worldwide. The site was placed on the List because it was deemed to have outstanding universal value in that it provides a unique example of the way of life in early agricultural settlements and of the organization and changes that took place in those villages. The authenticity, integrity and management of the site were also considered of high quality.

Çatalhöyük is indeed an important and distinctive Neolithic site with good preservation. It is located near Çumra, Konya in central Turkey. The East Mound was inhabited between 7400 BCE and 6000 BCE by up to 8000 people who lived in a large Neolithic 'town'. There were no streets and people moved around on the rooftops and entered their houses through holes in the roofs. Inside their houses people made wonderful art – paintings, reliefs and sculptures – which have survived across the millennia. The art was first excavated in the 1960s. New work at the site started in 1993 and is planned to continue to 2018, under the auspices of the British Institute at Ankara and with permission from the Turkish Ministry of Culture and Tourism.

The 1960s excavations were undertaken by James Mellaart and it was with great sadness that the project heard of his death in London this summer. On an evening in July the team gathered together at the top of the East Mound and remembered Jimmy and held a minute of silence. He made the site famous and we have increasingly understood what a good field archaeologist he was. His 1960s ideas and interpretations about the site have withstood the test of time and of our renewed analyses for the most part. He had visited the new work over the years with his wife Arlette and he and his kindness to the new project will be sorely missed.

160 people came to Çatalhöyük this summer from Britain, the United States, France, Germany, Canada, Serbia, Australia, Poland, Italy – in fact 23 different countries. All these people came to join Turkish colleagues working at the site. The new excavations use modern scientific techniques to reconstruct the ways that people lived at Çatalhöyük. The aim is to place the art of Çatalhöyük into its full environmental, economic and social context. In the current phase of the project we are attempting to understand the overall social geography of the site, how it was organized ritually, socially and economically. In particular we are trying to work out how the organization of the site developed in the earliest levels.

Figure 1.2. Excavation beneath the South shelter at Çatalhöyük. Photo Jason Quinlan.

In order to pursue this latter aim we focused in 2012 on excavating buildings in the lower levels in the South Area (Figure 1.2), so that ultimately we can get to the base of the mound in a larger area than was achieved in 1999. We got to the underlying clay marls then, but in the lowest levels we had found only refuse or midden areas. Now we are hoping to find out what the earliest houses looked like, especially since Douglas Baird has found oval houses at the nearby earlier site of Boncuklu.

So in the South Area we have been excavating a series of buildings such as Buildings 43, 89, 96 and 97. These have proved very interesting in their own right. In Building 89 a new plastered skull was found. This is only the second example found at the site and emphasizes again that human skulls were kept, passed down generations, and sometimes plastered. The skull was associated with the abandonment and closure of the building which in this case was unusual for other reasons also. The house was in the process of being renovated. A western room had been dismantled and earth collected in a pile in order to rebuild it. But, in the midst of this renovation project, the work was abandoned and the house was closed and filled in so that another house (Building 76) could be constructed on top. We had always thought that houses were rebuilt when they reached the end of their 'use-lives'. But clearly that was not always the case.

In the North Area our main achievement was to gain a fuller plan of all the buildings beneath the shelter. Ultimately we hope that the UNESCO heritage site will provide an opportunity for visitors to see how a 9000 year old town was organized. In previous years we had excavated

individual buildings in the north part of the shelter, but in 2012 we made good progress on filling in the gaps between them (see Figure 2.1). The plan shows a certain amount of ordering along a linear north-south axis, suggesting a degree of community control of or collaboration in the layout.

Figure 1.3. An obsidian mirror found in a burial in the North Area. Photo Jason Quinlan.

In order to start excavating these buildings in the North Area we had to excavate a good number of historic (Byzantine) and later Neolithic burials, the latter probably from houses that have been eroded off the top of the mound over the last 8000 years. Two clusters of Neolithic burials were discovered. One of these produced two beautifully made and complete obsidian mirrors. Although other examples are known from the 1960s excavations, we had only found fragments in our excavations since 1993. The mirrors are made by exhaustively polishing the obsidian surface with progressively finer abrasives. The end result is a surface that you can still see a face in (Figure 1.3). While the mirrors may have been used for the application of facial cosmetics, it is also possible they were used in divination or had some other function.

Figure 1.4. Skeleton found in fill deposits in Space 87 in the North shelter.

Once these later burials had been removed, we were able to start excavating the new buildings that were discovered beneath the North shelter. Some of these were of particular interest. Space 87 is a very small and unusually shaped building that was initially excavated as part of the BACH project in the 1990s and early 2000s, when a large number of burials was found. In 2012 we started excavating the fill in the remainder of the building. We found large amounts of disarticulated animal bones – and one very intriguing human body. We nearly always find human bodies in crouched positions in graves beneath the floors of houses. In this case the body was sprawled out within the fill of the building – as if in mid stride! (Figure 1.4). All the smallest bones were in good articulation suggesting that the body had been thrown in with flesh on. But at some later date the head was removed. Again we have evidence of the special attention paid to human heads at Çatalhöyük.

Figure 1.5. Areas excavated and surveyed in the 2012 season. Plan Camilla Mazzucato.

Of course, it is inadequate to reconstruct the organization of Çatalhöyük from the two excavation areas between the South and North shelters. In 2012 we also started a new excavation area termed TPC just to the east of the South shelter. And we continue to have teams working on the later West mound. We also had two teams – one from Italy and the other from Southampton – conducting geophysical survey over large swathes of the East Mound. Figure 1.5 shows the areas excavated and surveyed in the 2012 season. Although we had done similar work in the 1990s, the techniques have developed since then to such a degree that it seemed worthwhile to conduct a new survey to see if there was any aspect of spatial organization that we had missed in the earlier work. In fact what we were able to see using ground penetrating radar has only fortified our view that the mound consists only of closely packed houses and areas of midden. There is, however, evidence of linear divisions such as that running to the north of the mound.

Another very important part of our work, related to the UNESCO inscription is the conservation and presentation of Çatalhöyük to a wide audience and the engagement of different stakeholder communities in its care. We have a number of teams working on this aspect of the project, for example dealing with conservation, site presentation and the use of multimedia and 3D visualization. This work is described elsewhere in this volume. We trust that this work will ultimately provide a heritage site worthy of its new UNESCO designation.

Other Activities

Much of our work on conserving and presenting the site this year focused on the North shelter because this shelter has caused more problems over recent years and because we have opened up new areas of excavation there that need to be put on display. In addition the new status of the site as a UNESCO World Heritage site means that we have to be yet more careful about long-term planning for conservation and public access.

Figure 1.6. New walkway path by the Southern end of the North Shelter. Photo Jason Quinlan.

In the North shelter we completely reorganized and upgraded the visitor walk ways and signage so that visitors could get a better look at the new excavations and the new buildings being exposed (Figure 1.6). This included having tourists walk along a wooden pathway laid on a Neolithic 'street' - actually not a street but an area of refuse between two building blocks. We also had the results of monitoring the shelters' environments over the last year and were able to make decisions about how to properly conserve the Neolithic buildings under the North shelter over the long term. So we started a new program of capping the walls to protect them and we are expecting that this new method, using clay recycled from the mound itself, will

provide a solution to our long-term needs. We also put up a sign in the North shelter saying that the refurbishment of the shelter was funded by a grant from the Hedef Alliance. In the South shelter we added substantially to the reinforcement of the exposed earth surfaces using sacking and geotextiles.

In addition a team from Southampton University came to the site and made important changes to the display in the Visitor Center and to the information panels on the site. They also assisted in the production of plans for the new series of experimental houses that we would like to start constructing in 2013, and the plans for these were passed through the Konya Koruma Kurulu successfully. The Southampton team also prepared a version of the Site Guide Book in Turkish for printing and sale at the site, and a new information leaflet to be handed to tourists during their visits. A new updated information panel was placed at the entrance to the site.

The educational program based at the site has continued to be highly successful. Over recent years Gülay Sert has brought up to 600 children and educators to the site each season. The children and other participants spend a day at the site in small groups learning about the site and about heritage in Turkey and taking part in craft exercises and excavating and sieving the mounds of earth left by James Mellaart. In 2012 a wide range of schools and educational programs were included. Veysel Apaydin is studying the long-term effectiveness of these programs in his PhD research at UCL. Local community participation in the site and project was fostered by a series of activities organized by Sema Bağcı. Newsletters were produced for the local villages and talks were given for local groups, and the local villagers were invited to a festival at the site at which the work on the site and in the laboratories was explained, and discussions were held with the men and women from the villages about how the site should be developed.

Acknowledgements

An international team now based in London University (UK) and Stanford University (USA) has undertaken archaeological research at Çatalhöyük since 1993, with a permit granted by the Ministry of Culture and Tourism, and under the auspices of the British Institute at Ankara. We are especially grateful to the General Director of Monuments and Museums.

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The institutional partners of the project are Selçuk University, Stanford University, University College London, Oxford University, Istanbul University, University of Southampton, Middle Eastern Technical University, SUNY Buffalo, and Cardiff University.

Field Team 2012

Project Director	Ian Hodder
Project Coordinator	Banu Aydınoğlugil
Assistant Director	Serap Özdöl
Government Representative	Lütfi Önel
Camp Manager	Levent Özer
Site Assistant	Oktay Uzun
Site Custodians	İbrahim Eken, Mustafa Tokyağsun, Hasan Tokyağsun
Field Supervisors	James Taylor, Burcu Tung
East Mound Excavations	Numan Arslan, Erin Baxter, Agata Czeszewska, Rebecka Erntell, Gunhild Eriksdotter, Patrycia Filipowicz, Ramazan Gündüz, Susan Hyden, Justine Issavi, Kristina Jonsson, Arek Klimowicz, Arek Marciniak, Allison Mickel, Arne Sjöstrom, Onur Yüksel
West Trench 5 Excavations	Peter F. Biehl, Jacob Brady, Clara Filet, Daniel Griswold, Friederike Jürcke, Goce Naumov, Sonia Ostaptchouk, Jana Rogasch, Eva Rosenstock, Eugen Ruzi, Kilian Teuwsen, Talu Tüntaş, Patrick Willett
West Trench 8 Excavations	Funda Değer, Burçin Erdoğu, Erkan Gürçal, Nejat Yücel
3D Digging Project	Nicolo Dell'Unto, Maurizio Forte, Nicola Lercari, Matteo Pilati
Stanford Field School	Brenda Benavides, Nicholas Brown, Jackie Low, Jack Martinez, Billy Sawoyo Sankei, Lauren Sweet
3D Digging Field School	Althea Asaro, Elisa Biancifiori, Chris Faria, Francesca Pajno
Poznan University Field Students	Malwina Ewa Brachmanska, Maciej Chylenski, Mateusz Dembowiak, Katarzyna Weronika Harabasz, Jedrez Hordecki, Weronika Stosik
Selçuk University Field Students	Tuğçe Ertabak, Mehmet Mertek, Melike Şahin, Mevriziye Tuncay
Ege University Field Students	Mert Atalar, Inan Aydoğan, İzettin Elalmış, Sevim Kurtuldu
Other Students and Volunteers	Renata Araujo
Survey	Marek Barański
Geophysical Survey	Stefano Campana, Gianluca Catanzariti, Gianfranco Morelli, Jessica Ogden, Kristian Strutt
Conservation	Rachael Greenberg, Ashley Morgan Lingle, Adam Klups, Flavia Ravaioli, Joanne Westbrook
Conservation Monitoring	Chris Cleere
IT Systems	Richard May
Database Development	Claudia Engel
Reflexive Methodology	Åsa Berggren, Alison Mickel, Bjorn Nilsson, Thomas Sutcliffe
GIS	Camilla Mazzucato
Image and Media	Jason Quinlan
Illustration	Katy Killackey
Finds	Jennie Borgstrom, Alana Colbert, Lisa Guerre
Heavy Residue	Milena Vasić
Faunal Team	Julia Best, Arzu Demirergi, Jennifer Jones, David Orton, Jacqui Mulville, Kamilla Pawłowska, Adrienne Powell, Kathryn Twiss, Jessie Wolfhagen
Human Remains	Sabrina Agarwal, Barbara Betz, Bonnie Glencross Jennifer Byrnes, Scott Haddow, Christopher Knüsel, Cansu Kurt, Clark Larson, Inbal Nachman, Joshua Sadvari
Palaeoethnobotany	Eleni Asouti, Mary Berman, Amy Bogaard, Mike Charles, Dorian Fuller, Anette Hansen, Rachel Hodara, Rosemary Hoshino, Ceren Kabukcu,

	Hyunyoung Kim, Jinok Lee, Jacob Moris, Charlene Murphy, Philippa Ryan, Ling Qin, Anna Shoemaker, Jade Whitlam
Chipped Stone	Deanna Aubert, Tristan Carter, Sean Doyle, Triantafyllia Eirini Dogiama, Rachel Ireson, Danica Mihailović, Adam Nazaroff
Groundstone	Christina Tsoraki
Pottery	Ingmar Franz, Hilal Gültekin, Duygu Tarkan Özbudak, Ozan Özbudak, Serap Özdöl
Figurines and Clay Objects	Carolyn Nakamura Aldrich, Lucy Bennison Chapman, Lindsay Der, Lynn Meskell
Hearths	Sheena Ketchum
Clay sourcing	Chris Doherty
Geomorphology	Gianna Ayala, John Wainwright
Dating	Alex Bayliss
Site Visualization	Sam Ainsworth, Jack Baigent, Angeliki Chrysanthi, Graeme Earl, Ian Kirkpatrick, Stephanie Moser, Sara Perry, Emily Richardson, Harish Sharma
Field Walking	
Archaeology Workshop	Cumhur Ertüzün, Özge Özkan, Gülay Sert, Hatice Tokyağsun
Community Archaeology	Veysel Apaydın, Sema Bağcı Kaya
House Staff	Saliha Eken, İsmail Salmancı, Nevriye Şener, Mavili Tokyağsun
Site Workers	Atiye Akbulut, Mustafa Bahçeci**,** İsmail Buluç, Ahmet Kürkmen, Hatice Tokyağsun, Mevlut Sivas, Hasan Yaşlı, İsmail Yaşlı, Lokman Yaşlı, Metin Yaşlı, Mustafa Zeytin,
Residue Sorters	Ebru Sivas, Fadimana Sivas, Saliha Sivas, Hatice Yaşlı, Şenay Yaşlı

Figure 1.7. The 2012 field team at Çatalhöyük. Photo Jason Quinlan.

2. Excavations in the North Area, 2012.

Burcu Tung
University of California, Merced

Introduction

The 2012 excavation season at Çatalhöyük marked the first of a four-year excavation phase of the North Shelter. This four-year phase of research will focus on revealing previously unexcavated occupation areas and understanding the stratigraphic relationships of the currently exposed buildings and building compounds not currently linked. This season, two important methodical changes were partially implemented in the North Shelter: one in excavation and one in recording. First, adapting a somewhat hybrid approach to the excavation methodology, two buildings (B.108 and B.113) were cross-sectioned to have a better understanding in the depositional sequences related to building abandonment as well as building use and construction. Second, alongside the project's aims to incorporate a wider implementation of digital recording techniques, a total-station was used for the recording of specific units in order to test field-based digitization.

This season, excavations in the North Shelter took place within six main areas that contained a number of spaces and buildings (Figure 2.1). Except for Sp.87 and B.77, most areas were recorded in the previous seasons only through surface scrapes. These areas, generally identified by Neolithic walls, contained largely eroded features. Two areas (Sp.77 and Sp.40) produced a large number of Neolithic inhumations that were in relatively poor condition due to their proximity to the surface. Nevertheless, these later Neolithic burials contained a larger number of beads and other forms of burial goods. Particularly exciting was the discovery of a cluster of burials within Sp.77 that contained 2 obsidian "mirrors". As the North Area was used as a burial ground after the Neolithic, from about the late Hellenistic Period to the Byzantine period, this year work within the new areas of excavation also revealed quite a few of these burials.

These six areas were excavated by experienced archaeologists accompanied by field school students from Stanford University, University of Poznan in Poland, and Selçuk and Ege Universities in Turkey.

North Shelter Excavation Team

Supervisors: Numan Arslan, Erin Baxter, Åsa Berggren, Rebecka Entrell, Ramazan Gündüz, Susan Hyden, Arne Sjöström

Students: Renata Araujo, Mert Atalar, Inan Aydoğan, Maciej Chylenski, Mateusz Dembowiak, Katarzyna Weronika Harabasz, Jackie Low, Jack Martinez, Mehmet Mertek, Billy Sawoyo Sankei, Lauren Sweet, Melike Şahin, Mevriziye Tuncay

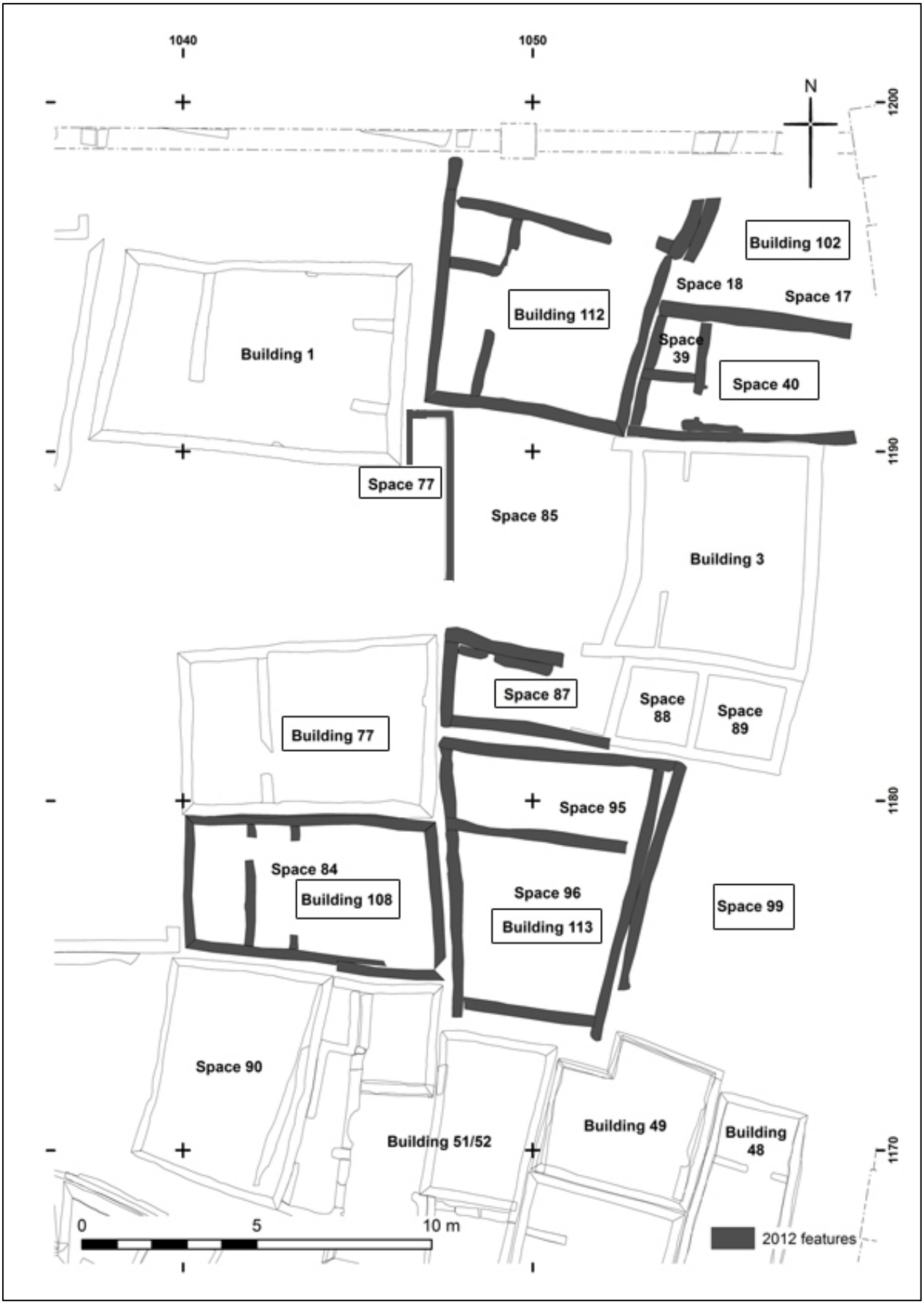

Figure 2.1. Excavations areas within the North Shelter in 2012. Plan by Camilla Mazzucato

Building 112

Building 112 was first identified as Sp.38 and Sp.37 through the 1993-94 surface scrape. It is located at the northern end of the shelter, immediately northeast of B.5. Spaces 38 and 37 most likely makeup the southern end of a larger building that extend to the north beyond the shelter. Its boundaries within the shelter measure 6.20m E-W and 5.60m N-S. Soon after its definition it became apparent that this building is largely eroded with only about 10 to 15cm of mud brick walls defining its outline. The building was cut by a midden dump (F.7107) that was composed of two distinct depositional layers within an irregular cut (20606) about 3.30m in diameter. The earlier layer (20489) was an ashy midden layer, sealed by layer (20467) that had a higher rate of building materials within its matrix.

Building 102

Immediately northeast of B.112 is Building102, first identified during the excavation of the foundation trenches for the North shelter in 2007. B.102, like B.112, extends outside of the North Shelter. The known extent of B.102 is comprised of two spaces, Sp.17 and Sp.18, divided by north-south running walls, F.3688 and F.2774, that also form a walkway between the two spaces. While the northern extent of the building falls outside of the North Shelter and has not been defined, both spaces share the southern wall F.3655. Wall F.3653 defines the western extent of the building while its eastern wall (F.2824) lies within Foundation Trench 2, and has been excavated in 2007 (Eddisford 2007:29). The southern and western walls meet within beam slot 2/3 of the North Shelter (Yeomans 2007:32). The dimensions of the internal areas, revealed this season, measure 2.60m by 3.40m in Sp.17 and 2.00m by 3.20m in Sp.18. Excavations are set to continue within these two spaces the following season, with the aim of reaching the deposits that define an earlier building that sits below B.102, documented in the 2007 excavations.

Space 17

The excavations led in 2007 in Sp.17, within the foundation trenches, revealed a series of primary and secondary burials that seem to have been placed within a possible northwestern platform defined by two consecutive plastered surfaces (15056 and 15065) (Eddisford 2007: 26). Beneath these surfaces at least eight individuals were buried in different episodes. To the south of these burials within the beam slot of foundation Trenches 1 and 2 and in Foundation Trench 2, still within the confines of Sp.17, was another complex burial sequence containing at least 8 disarticulated skulls and seven primary burials, one of which was missing its skull (*ibid.* 30-31). These burials may be associated with the red painted plaster found on the western wall (F.2824) and seem to have been cut into what appears to be a well-plastered bench/platform (F.2825/F.3019) abutting the western wall. This bench/platform was located immediately north of a post-retrieval pit that seems to have formed the north-south partition of the space.

This season, work in Sp.17 took place within the final few days of excavation and focused on the removal of room fill (20481). This fill, which was also within Sp.18 (see below), comprised of a brown clay loam containing large amounts of crushed orangish brown mud brick, plaster, charcoal flakes, as well as an abundance of phytoliths. Its removal revealed a number of features within the space that have not yet been excavated (see Figure 2.2). A large oven was located (F.7101) abutting the southern wall located the southwestern corner of the space. The northern half of this oval shaped oven that measures 1.12m in length falls within the section retained for excavation. Immediately north east of the oven towards the middle of the space is a circular hearth some 0.60m in diameter. At the southeastern corner of the space, a plaster feature that resembles a bin wall abuts the southern wall. There is a semi-oval cut that abuts division wall F.3688. Embedded in the oven was a fire cracked stone (19598.x1) which was removed. The

floors surrounding the oven and hearth are compacted dirt surfaces with an abundance of phytoliths similar to the room-fill and therefore difficult to discern. In fact, some floor levels were truncated during excavation. Still, the current identified floor levels of the space remain a few cm above the floors identified in the Northern beam slot in 2007, and about 10cm above possible platform surface in the northwestern platform of the room.

Space 18

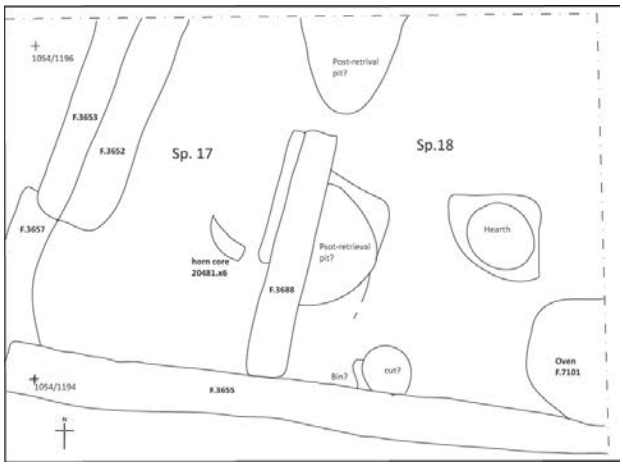

Figure 2.2. End of season multi-context plan of B.102.

The north beam slot excavations in 2007 revealed a very small area of Sp.18 that contained a bin (F.2777) abutting an eastern wall (F.2775) and some dirty floors (Yeomans 2007:71). As in space 17, excavations in Sp.18 commenced only towards the end of the excavation season. The excavation of some 0.25m of room infill (20481) within this space has not revealed any discernable features. One auroch's horn core (20481.x6) was found towards at the eastern end of the space, within the room fill. It is not clear whether wall feature 3652 located in the western end of the space represents collapse a modification to the original western wall (F.3653) of B.102.

Space 40

Space 40 is located immediately south of B.102. Along with Sp.39, which is more of a cell-sized space, it covers an area 9.10m east-west and 3.50m north-south. It is not entirely clear whether Sp.39 and Sp.40 make up a distinct building, or whether they form a large complex with B.102 as their northern wall is the southern wall of B.102. The western wall of Sp.40, wall F.2827 was excavated within Foundation Trench 3 and beam slot 3/4 in 2007 (Yeomans 2007:32). The southern extent of Sp.40 is defined by wall F.3660, while F.3656 constitutes the western wall of both Sp.39 and Sp.40. This season, work within Sp.40 focused on the removal of 11 burials that were located in the north-western corner of the space. In an area about 2.45m by 2m, 11 individuals were buried in three separate groups. The burials actually belong to a later eroded building that would have been sitting immediately above Sp.40. The burial locations suggest that the individuals were all buried underneath a platform, although no such evidence was actually found. The 9 sub-adults and 2 adults uncovered in this area were in fact generally in good condition relative to their proximity to the surface, and in comparison to the individuals uncovered in Sp.77 (see below).

Burials F.3669 and F.3670 were located in the southwest corner of this area. Feature 3669 was the burial of a child, sk. (20442) within cut (20443), laid in a north-south axis, lying on its right side with its head to the south, facing east. This individual was partially disturbed by the cut (20466) of sk. (20445) that belonged to burial F.3670. Sk. (20445), the remains of another child, was also flexed and laying on its right, with its head to the south facing northeast, although in a bit more of a northwest-southeast orientation. Immediately north of these two burials, three individuals were buried separately at the northwestern corner of Sp.40. The earliest interment, burial, F.3665, contained the remains of an adult skeleton (19499) that was heavily disturbed and only partially complete. Its cranium, lying on its left was facing the southeast. Within its fill (20400) were two bone pins (20400.x1 and 20400.x2) that could not be certainly associated with

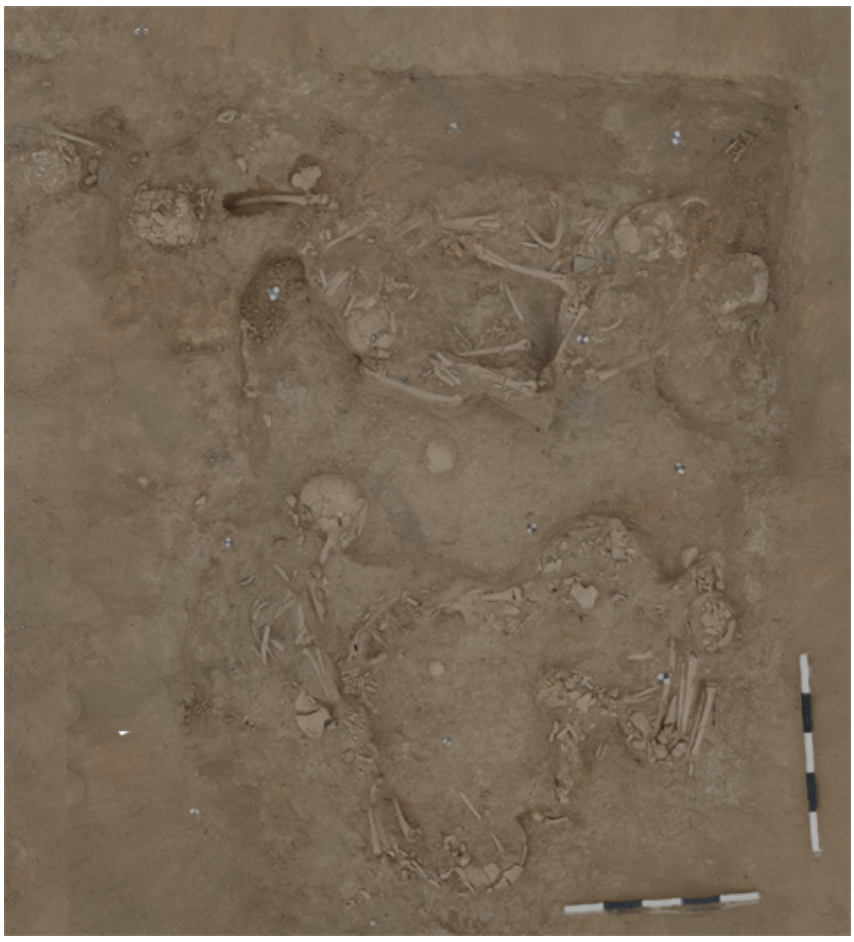

Figure 2.3. Skeletons (19472), (19488), (19489), (20411), (20419), (20422), (20434), (20442), and (20445). Photo facing east. (Photo, Scott Haddow).

Figure 2.4. Beads (20203.x3) *in situ* within burial F.3662. Photo by Jason Quinlan

the burial. Skeleton (19499) was disturbed by burial F.3668 that belonged to a three year-old skeleton (20422), which in turn was disturbed by burial F.3666 that belonged to another sub-adult, sk. (20411).

Immediately to the west of this group was burial F.3663 that belonged to a flexed child, sk. (19488) lying on its left, head facing southeast. This individual had been cut by F.3664, the burial of sub-adult sk. (19489), which was heavily disturbed due to an even later burial (F.3667). Burial F.3667 belonged to a female adult, buried in a flexed position oriented northeast-southwest, with its head facing the north. This individual was buried with anklets and a necklace, as evidenced with over 200 small stone beads found around her ankles and some wooden beads around her mandible (see Asouti and Kabukcu, this volume, Figures 21.5-16). This 20+ year old adult was buried immediately next to an 8-year old child (sk. 19484, F.3662) that was missing its cranium. 3 stone beads were found by its mandible (20203.x1) (Figure 2.4), marking the only other burial within this context that was buried with body adornment. Both burials F.3662 and F.3667 cut the earlier interment of an adult skeleton (19472) that was defined as F.3661. The skeleton of this individual was highly disturbed. The final burial within this sequence spatially located below F.3667 was the burial of an adolescent skeleton (20434) (see Figure 8.1). This burial, defined as F.3683 was about 15cm deeper than any of the burials excavated within the area. Its bones contained a brown/black patchy coloration that was not observed on other skeletons. This burial most likely represents the earliest burial within the sequence, and most probably owes its preservation to its depth.

As of the conclusion of the 2012 season, the relationship between Sp.40 and Sp.39 to B.102 remains unclear. The burials suggest at least one later occupation phase immediately above Sp.40. As the eastern wall of Sp. 40 abuts the southern wall of B.102 and that both walls were plastered internally shows that the use of the space post-dates the construction of B.102. It is worth noting that the floor levels related to Sp.40 were never reached during the foundation trench excavations, which stopped about 70 to 80cm below the current surface level. It is possible for Sp.40 to be associated with an earlier structure lying beneath B.102 (see Eddisford 2007:26, 29). In any case, the relationships between Sp.40 with B.102 and its predecessor will be the focus of investigation in this area in the coming field season.

Space 77

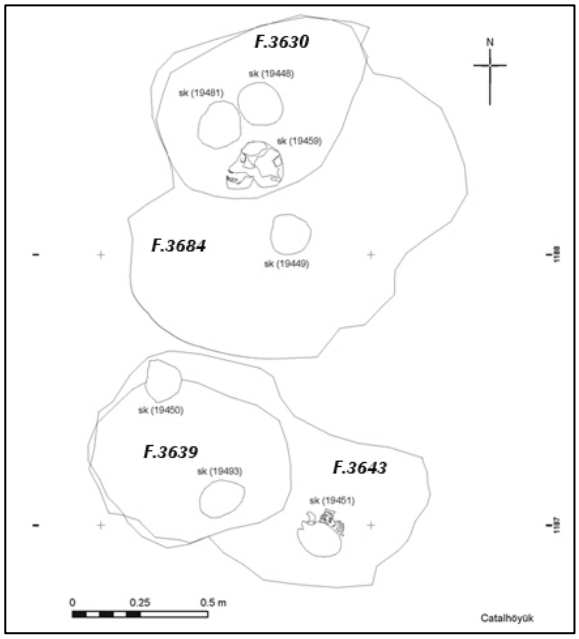

Figure 2.5. Plan of the distribution of skulls and some disarticulted remains wihtin Features F.3630, F.3684, and F.3639 and F.3643 in Sp.77. Plan Scott Haddow.

Space 77 was first defined in the 1993-94 surface scrape. Its eastern and northern walls (F.222 and F.221 respectively) were recorded during the 1998 field season. These bonding walls were built after Building 1, but before the construction of Building 5 that lies directly beneath B.1. The western extent of the space is undefined as it is currently covered by the bridge that allows visitors to pass across B.5. At the onset of the excavation season, initial cleaning in the area uncovered some human remains that required further investigation. By the end of the season, a series of Neolithic burials within three adjacent burial pits roughly aligned east-west were recovered. They contained at least 14 individuals, 6 of which were represented only by their skulls (see Figure 2.5). No sex assessments could bex made except for skeleton (20601), as all skeletons were very poorly preserved due to their proximity to the surface *(see Human Remains report, Ch. 8)*. Moreover, the cuts that belong to the various depositional sequences were difficult to identify.

The only discreet burial, burial F.3643, was located in the southern end of the area, and contained the upper body remains of a child skeleton (19451) oriented northwest-southeast (Figure 2.5). The remains of a neonate (19578) was scattered within infill (19465), and possibly belongs to an earlier burial within this southern section.

Immediately west of this burial were a series of inhumations in which an adult male (sk.20457) was the earliest interment (burial F.3645). Only its feet, forearms, and hands were found *in situ*. The rest of his body was disturbed for the burial of skeleton (20430), a tightly flexed sub-adult lying on its back, body facing north (burial F.3686) (see Figure 8.5). This individual's skull was missing, and may have been actually removed some time after its burial. Two disarticulated individuals, and skulls were located immediately above skeleton (20547) within burial F.3639 (see Figure 8.4). These skulls (19493 and 19450) represent the most recent activity within this pit of burials and may be contemporary with the interment the skulls wihtin burial F.3684 and F3630 (see below).

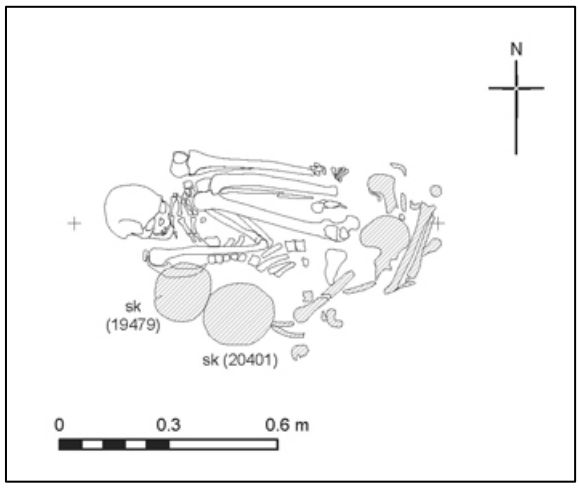

Figure 2.6. Burial F.3684, with the remains of sk (20601) as the primary burial. Plan Scott Haddow.

Adjacent to the burials described above, to the north, was burial F.3684 containing one primary articulated skeleton (20601) and three disarticulated individuals (skeletons 19449, 19479, 20401) (Figure 2.6, Figure 8.3). The primary burial skeleton (20601), was an adult male tightly flexed on its left side and oriented east-west, with the head to the west, facing east, thus with the head flexed on the torso.

Immediately north of this group of burials was burial F.3630 that again contained a number individuals. Skeleton (19460), an articulated sub-adult buried in a flexed position, oriented east-west, head toward the west and facing north, could possibly have been the last interment (Figure 8.2). Immediately above it were the disarticulated remains of three individuals, two of which were only represented by skulls. Within this burial complex were two obsidian mirrors (Figure 2.7), one of which could have been associated with skeleton (19460) (see Figure 8.2). Numerous beads were also found around the ankles, chest, and head region of this individual, and many more were found within the burial fill (Figure 2.8). An interesting aspect of both mirrors, was the existence of blue and green paint pigment wihtin their vicinity and on their concave ends.

As the full extent of the space has not been defined, it is impossible to yet say whether these burials were interred under a platform, or whether they were actually buried within a small room, as we begin to see on site during the later Neolithic.

Figure 2.8. Obsidian mirrors 19447.x3 and 19447.x4 within burial F.3630. Facing west. Photo by Jason Quinlan.

Figure 2.8. In situ beads wihtin burial complex F.3630

Building 77

Figure 2.10. The upper portion of the geometric design on wall F.3095 in B.77.

Figure 2.10. One of the new hand prints found on the eastern wall of B.77

This year work within B.77 took place within its main space, Sp.336, and focused on the micro-stratigraphy of the wall paintings located at the north-eastern corner of the building on the northern and eastern walls. The eastern wall (F.3095) was particularly challenging as the wall's plaster had unevenly fallen of during the Neolithic and therefore had undergone many episodes of repair. For example, a geometric design on the lower section of the wall was uncovered in 2008 and later excavated in search of earlier layers of wall paintings. This year, we found the continuation of the pattern, on the upper portion of the wall, but actually on a much earlier plaster surface (see Figure 2.9). Almost immediately underneath the geometric pattern were three red handprints (Figure 2.10), belonging to the same hands that decorate the northern wall. The handprints most likely belong to an earlier phase of the building's use, and their discovery on the Northern wall has allowed us to be in the same phase on both walls. Further, work was undertaken on the north-eastern platform (F.6051), where the earliest phase of the platform was reached. East of the platform, in front of niche F.6063 was the burial of a neonate, which was either wrapped in fabric or placed within a basket that was woven with very fine plant fibers. This season, the building's earliest oven that truncates its southern wall, was also partially excavated. Finally, all the burnt posts that had been left in situ were excavated as the their exposure over the years made them extremely friable. Excavations within the building are to continue next season.

Platform F.6061 and adjacent walls F.3094 and F.3095

Most of the work within the northeastern corner of the Sp.336 focused on understanding the sequence of wall paintings. A series of plaster layers were removed from the northern wall, (19462, 19463, and 19464) to reach a uniform layer on the wall represented by the red hand prints. During the excavation of (19464) it became increasingly apparent that the northern wall had undergone repair events during its use-life that had largely destroyed a sequential development of plaster layers within the wall.

It took much more patience to reach the same uniform layer with the eastern wall, as the micro stratigraphy of eastern wall was even more complex. By the end of the season, with the removal of the layer (19465/19051) which represents the geometric pattern on the lower end of the wall, it became apparent that this section of wall had undergone much more plastering than the upper end of the wall. By the end of the season, it became apparent that the red hands

continued on to the eastern wall, underneath the geometric pattern and represented an earlier phase in wall "elaboration".

Figure 2.11. Conservation team removing the basket / fibre burial (F.3642) for further study.

The earliest phase of platform F.6051, likely correlated with the red hand paint on the walls, is represented by layer (20498). This layer, left *in situ,* contains a patchy red surface, most likely associated with the earlier burial events that have taken place within the platform. (20498) was sealed by (20482) which was a very burnt silty clay make-up layer, most likely same as (19539) excavated in 2011.

Immediately east of the platform, in front of niche F.6063, was a burial of a neonate F.3642. The skeleton (19494) was crushed and damaged due to the burning of the building. The neonate was buried in either a very finely woven basket or wrapped in some fibrous material. The burial was block-lifted for conservation to understand the exact material the skeleton was interred in (Figure 2.11).

Oven F.7108

Originally thought to have been a blocked niche, oven F.7108 was discovered at the end of the 2011 season (Eddisford 2011, 37) and was left for excavation for the following year. This oven, which belongs to the earliest use of the building, was later truncated by oven F.3621. The oven, which had four four separate floor constructions, was partially excavated this season.

In 2011, the left upper oven blocking was partically excavated as layer (19551), leaving a gap in this section. This season, after the removal of a mud brick blocking (20424) which most likely actually belonged to the upper construction of oven F.3621, a decision was made to excavate the western section of oven F.7109 to have a full understanding of the depositional sequences that remained. Below is the field description of the oven, extracted from the site database.

Figure 2.12. Mud brick (20496), possibly from earlier building.

"The oven has a domed superstructure and it was situated in the dirty area in space 336. It was built into wall F.3096 and precedes a later oven, which makes it the earliest oven in building 77. The clay dome is preserved with its roof intact and it stretches about 0,8 m into the wall. The back of the dome can be seen from the other side of the wall (in space 488). The oven had four series of oven floors and after its use life it was infilled and blocked with different kind of materials and another oven was built in front of it.

Figure 2.14. The latest floor (20464) of oven F.7108.

Figure 2.14. The blocking of oven, with possible superstructure (20424)

The oven was either cut into the wall or possibly built at the same time as the house (the clay dome is not yet excavated). The wall (20496) from an older building (made of mud brick and mortar) and old infill (20483) were used together with a make-up/levelling layer (20478) as an oven base. The dome was constructed of clay layers with more than one application (there were plaster remains inside) and it abuts the first oven floor. All oven floors were sloping. This was made on purpose and was not a result of later subsidence, but for what reason is an open question. The first oven floor (20473) was badly preserved and fragmented, part of it was probably raked out and a leveling layer (20477) was put into the oven in order to build a new oven floor (20469). The succeeding three oven floors (20469, 20466, 20464) were better preserved, especially the last oven floor was in good condition and it did not look scorched. Maybe the abandonment of the oven was not due to the need for a new floor (which perhaps would have made the oven to narrow), but rather for another reason, maybe a threatening collapse or because the last floor actually did make the oven to narrow or perhaps for reasons which is not so practically founded.

The oven was infilled and blocked in an interesting way. The varied material that was used for the blocking infill seems to represent the building material of a house. First a large chunk of floor plaster with make-up layers was put on top of the last oven floor, right in the back of the oven. Then a clayish material mixed with charcoal, a burnt piece of mud brick and about three chunks of plaster layers were put into the oven together with pieces of oven wall (perhaps originating from a destroyed part of the oven).

The function of the different blocking materials that were applied to the oven after that the dome was filled is unclear. Like the infill of the oven, they were of different materials, compact clay, soft and friable clay and mud brick made of mica-based clay. Initially the mud brick blocking was thought to be part of a later oven but the material/texture of the blocking makes this less probable and it may as well have been made to harmonize with the surrounding wall." (Susan Hyden)

The posts of B.77

The timbers used in the construction of B.77 came from a single oak tree. This season the remains of all timbers were excavated, as 3 years of exposure to the elements had largely damaged their integrity. There posts were incorporated into F.6959, bin F.6061 and bench F.6059 that aligned with the western wall of Sp.336. The removal of post (17541) and its surrounding matrix that was made up of an ashy soft silt revealed an oval cut (19599), about

Figure 2.15. Cut (19599) for post(s) (17541). Facing west.

0.37m in width, 0.18m in length and 0.62m deep. The cut ended with "two separate pits toward the bottom", perhaps once holding 2 separate posts (Figure 2.15). The poor condition of post (17541) made it impossible to tell if that was the case. The cut for post (17543) was shaped like an elongated oval, about 0.50m wide, and only 0.15m thick. It extended 0.58m below the surface. Post (17540) was placed within cut (19594) was similar in shape and size to cut (19599), 0.38m wide, 0.22m thick and 0.65m deep. Across the space, cut (20600) contained post (17538). A highly polished worked bone too (17538.x1) seemed to be intentionally placed on the side wall of the cut that was about 0.65m deep. The object suggests that the practice of leaving objects within post holes at Çatalhöyük were are not only related to post-retrieval practices.

Building 114, Space 87

Sp.87 is an east-west oriented rectangular space, measuring internally about 4.60m in length and 1.7m in width. Located immediately southwest of B.3, west of Sp.88, Sp.87 was partially excavated by the BACH team between 1997 and 2002. With its size, wall modifications, burials, infill content, and painted walls, Sp.87 constitutes an unusual building containing evidence for extensive symbolic activity throughout its life-history.

Figure 2.16. Overveiw shot of excavation in progress within Sp.87, with Erin Baxter retrieving an animal bone cluster from the northwestern corner of the space.

While not entirely clear, Sp.87 most likely formed a single building with Sp.88, of which it shares its eastern wall (F.1020). It is defined by wall F.3682 to the north (which possibly is the same as F.1026, the northern wall of Sp.88), wall F.1020 to the east, wall F.1024 to the south and wall F.3680 to the west. Stevanovic notes that wall F.1020 was cut by a post-Neolithic burial and damaged by animal burrowing, largely eliminating all evidence for a passageway between the spaces (Stevanovic 2012, 155). The makeup of both spaces suggests strong connections between the two rooms, which are now defined as B.114. All of the walls are 35-40cm in thickness, and built with a brown sandy mud brick and dark grey mortar. They are heavily plastered on the inside with red paint on the southern and eastern walls (also see Stevanovic 2012, 156). The northern wall, F.3682, is flanked by support wall F.3681 that abuts wall F.3680 to its west and extends roughly 280cm to the east. While the immediate reasons for its construction remain unclear, this support wall represents a major change in the life-history of the space. The southern wall,

F.1024, contained two red painted grooves running across the western two thirds of the southern wall. A small circular depression about 4cm in diameter site between the two grooves which are about 5cm thick and 2-3 cm deep and level. Red painted grooves have been found in the South Area in B.80 and are seen in a few shrines excavated by Mellaart (i.e. Shrine A VI.I [Mellaart 1963, 50]), yet remain different than the ones in Sp.87 as they are a single band running across the full division of a wall.

The BACH team excavated the eastern end of the space, uncovering an area 145cm x 160cm defined by the northern, eastern and southern walls and the excavation trench to the west. Based on floor construction and abandonment practices, Stevanovic (2012, 84) allocated three phases to this end of the space. Phase S.87.1 represents the earliest two sequences of floors, phase S.87.2 correlates with the later two sequences of floors and phase S.87.3 is the abandonment sequence. Cut into the various floors that most likely belonged to a platform, the BACH team uncovered a sequence of six burials with a total of nine individuals. Two individuals, one baby burial within a basket and an adult, in the bottom of the sequence had been left *in situ* for excavation in the future.

Figure 2.17. Red ochre, visible on skeleton (8598) and the individual below. Photo by Jason Quinlan.

This season, immediately after the removal the backfill that protected the excavated portion of Sp.87, these two individuals were uncovered. Albeit out of sequence in relation to the remaining deposits within space 87, we decided to immediately excavate the burials before they further deteriorated due to exposure. The earliest burial so far uncovered within this sequence is burial F.3629 containing a female flexed adult (see Human remains report below) (skeleton 8598, Figure 8.6) lying on its right oriented east-west, head facing west. The bones of this individual were covered in red ochre (Figure 2.17). Burial F.1014, a neonate (8596) within a lidded basket, which had been stabilized in 2002 (Hager and Boz 2012, 314), was placed directly on the feet of skeleton (8598). Burial F.1014 was largely destroyed by animal burrowing on its northwestern end. Due to its proximity skeleton (8598), basket (8597) was excavated rather than preserved as a block, revealing a neonate was placed on its left, head facing east. That both individuals, albeit even if one within a basket, were facing each other and their adjacent placement suggests that they were interred at the same time and possibly even had a close relationship (mother/child) before their interment. The burial fill (19439, 19435) was a relatively homogenous compact grayish brown clay loam, containing small pieces (c.5mm) of orange clay aggregates and some building material, as well as small flakes of charcoal and phytoliths. One polished piece of amorphous animal bone (19435.x1) was found in the thorax region of skeleton (8598). Long bones belonging to another adult placed to the side within the fill indicate an earlier burial that remains to be excavated.

Once the burials were recorded and excavated, attention was directed on the unexcavated portion of the space. Albeit small in area, the excavation of the room infill (19475, 20404, and 19570) proved challenging and took longer than expected due to the large number of articulated

animal and human remains encountered within the infill. The infill was defined by its heterogeneous nature. Its matrix consisted of a compact light brown clay loam, and contained large aggregates of pure brown clay, mud brick, plaster as well as re-deposited burnt surfaces (also noted by Stevanovic 2012, 156). Further, it included of large numbers of articulated animal and human bones as well as a total of 17 horn cores. Many large pieces of the articulated animal bone were leaning against the wall within the undercut of both the Northern and Southern walls (see below). Stevanovic (2012, 156-7) also notes the existence of large animal bones leaning against and partially buried within the walls, such as a mandible and a long bone pushed into the southern wall (3560.x2 & 3560.x4) in addition to human bones scattered within the infill.

Unit (19570) and (20404) are believed to be continuous units and will be discussed together. They represent the earliest deposits excavated in this section of the space. These units contained a total of 23 x-finds mainly composed of articulated and disarticulated animal and human bone. While found within all areas of the deposits the x-finds concentrated in two main areas: the northwestern corner and the centre of space. Much of the articulated bone, that within the northwestern corner, that include vertebra (20404.x10) and a large skull of an unidentified animal (20404.x7), were placed within an area that resembles an alcove (see below) and the undercut of the northern support wall F.3681. The central part of the room included vertebrae (20404.x3, 20404.x4, 19570.x1), one scapula (19570.x4), and two mandibles (20404.x14, 20404.x15). A skull of an adult human recorded as 20404.x12 lay immediately above horn core (19570. x4) on the western end of the space. Another adult skull (skeleton 19588), lying within the same level, was found some 40cm south of skull 20404.x12 placed upside down within fill (19570) facing the western wall. It was in rather poor condition and associated with a number of large animal bones, notably the cervical vertebrae of a boar, which it was actually in contact with. Further a rock was found in contact with the skull's occipital end. Immediately above skull (19588) was bucranium 20404.x19 intentionally placed within the infill so that the right horn was leaning against the western wall and the left horn was leaning against the southern wall (see Figure 2.18). Similar to the bucrania attached to the mini-benches in B.77, the skull of the cattle was cut near the horns. However bucranium (20404.x19) was not associated with it any architectural features.

Figure 2.18. Bucranium 20494.x19

A rather puzzling find within the matrix of unit (19570), right before the closing of the season, was the skeleton of a juvenile (sk.19593) (Figure 1.4, 8.7). No cut was found associated with the skeleton which was lying on its left side oriented east-west, facing east. Its legs were slightly extended with its right leg in front of the left leg. Its right arm was extended in front of its body with its right hand reaching out to its right knee. Its left arm and hand are most like still within the infill. While the mandible of the adolescent remained in anatomical position, the remainder of its skull was missing. However the feet of another adult (skeleton 20604) were found in association with the adolescent. A fully articulated right foot was located by its mandible and a fully articulated left foot was placed right by its dorsal side. Again, no cuts could be determined in relation to these feet.

Unit (20488) "*characterized by blackened, burned soil made up of clay, silt, sand, with concentrations of ashy, charcoal, burned brick, rock and plaster*" (Erin Baxter) was located adjacent to the southern wall, in the central area of the space, about 0.75m wide and 0.55m

long. Was initially recorded as a 'dumping' event similar to (20403) in between units 20404 and 19570. However, after its excavation it became clear that the deposit is most likely associated with a post-retrieval pit, evidenced by the correlating post scar on the southern wall. What is puzzling is the stratigraphic sequence of the event, correlating not with immediate abandonment sequences but rather later ones (see discussion below). Within the unit were two horn cores (20488.x1, 20488x.2), one, which was still attached to piece of skull.

Above infill (20404) located centrally but closer to the western end of the space was unit (20403), signifying a deposit made up of burnt brick, bone, rock and some pottery, a lot of charcoal and ash covering an area 1.1m wide and 0.75m long. With no evidence of heat transformation within its surrounding matrix and its amorphous shape, this unit most likely represent a single depositional event similar to the 're-deposited fire installation' identified by Stevanovic by the mid section of the southern wall above the sequence of burials as well as unit (20488) described above. One horn core (20403.x2) extended from the southeastern end of the deposit towards the southern wall, its tip leaning on the wall, within the undercut. Sealing (20403), immediately under the surface was (19475), an infill showing similar characteristics to (20404) and (19570). Its boundary with (20404) was diffuse. This unit also contained a similar concentration of large pieces of animal bone within the central area of the unit, right above the burnt deposit (20403). Included within this concentration were three horn cores (19475.x3, 19475.x9, 19475.x7), a mandible (19475.x8), ribs (19475.x6, 194754), and a scapula (19475.x5), mostly belonging to aurochs.

Discussion

The floor levels on the western end of the space have yet to be reached. During the removal of skeleton (19593) the outlines of a few architectural features began to appear around the northwestern corner. The excavation of infill (19570) was left about 5cm above the latest floor surface on the eastern end of the space. However it is possible though for the floor levels on the Western end of the space to be around or over 20cm below the current level, as the eastern portion of the floors lip down forming a platform ridge that was partially excavated this year as unit (19480).

The excavations so far suggest that the infilling of Sp.87 took place within a short span, as no surfaces were identified during excavation. However, there may have been a break in infilling that is represented unit (20488), which is most likely part of the filling of a post-retrieval pit. It is possible for the event to be contemporaneous with (20403). Halfway through the ritualistic infilling of the space, the Neolithic inhabitants may have then decided upon retrieving what so far seems to be the only post within the space. Unit (20403) with its burnt re-deposited material and burnt bone suggests a feasting context similar to the inclusions of unit (20488). Next season the nature of this deposit will be further addressed, as its current interpretation within the sequence of house-abandonment does not fit into typical Çatalhöyük practices (see Farid 2007:53).

The southern wall F. 1024 and northern support wall F.3681 were undercut any where between 0.15 to 0.20cm during the occupation of the building, evidenced through the re-plastering of the walls. The full extent of this undercut will be uncovered next season. Of particular interest is the way in which the undercut was deliberately filled with various animal bones. Also, nature of the human remains found within the infill does not suggest post-depositional mixing but rather deliberate placement. Similar deposits of animal and human bone found within the small portion of infill left in Sp.97 (Yeomans 2011, 17-8) suggests though that such practices are not unique and deserve further attention.

The goal for the following season is to reach the floor levels on the western end of the space to tie the two ends of the building together. Once all the deposits within the space are in phase, the nature of the remaining burials within the eastern portion of the space will be uncovered.

Building 108

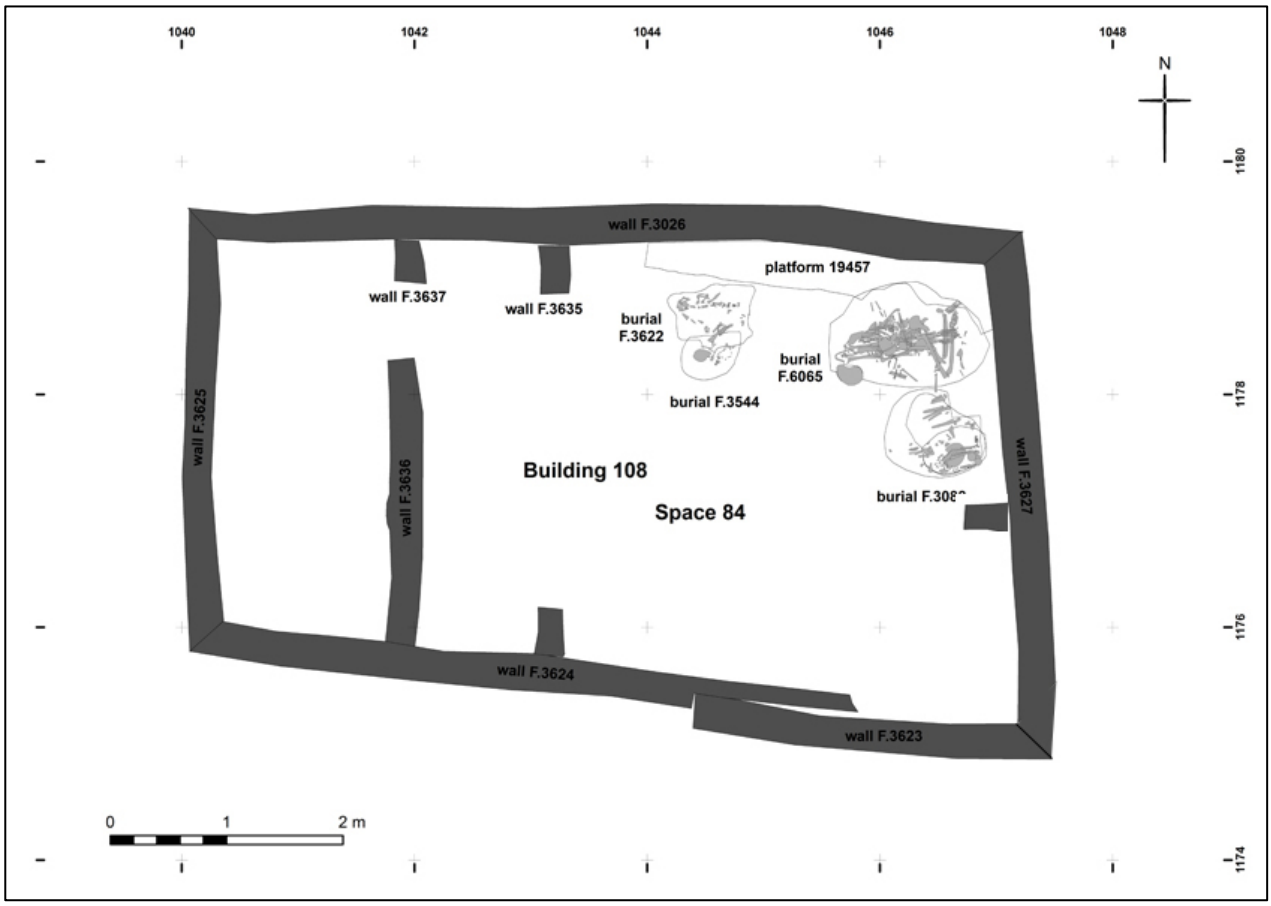

Figure 2.19. Plan of B.108 with related skeletons and platform remains. By Camilla Mazzucato.

Located between B.77 and the B.52 complex, Building 108 (Figure 2.19) is a rectangular building oriented east-west, measuring about 7.30m in length and about 4.10m in width. This year, the building was cross-sectioned north-south across its main space, Sp.84 and excavated by its eastern end. However, before the excavations began on the eastern end of the space, the boundaries of the building were defined with the removal of some of the surface soil. Soon it became clear that B.108 was composed of two spaces, separated by a partition wall (F.3636) that ran north-south 1.75m east of the western wall. The building itself is defined by wall F.3026 to the north, wall F.3627 to the east, walls F.3624 and F.3623 to the south and wall F.3625 to the east. An interesting feature of the building are three small buttress-like mud brick features placed somewhat symmetrically halfway along the extent of the northern, southern and eastern walls. These buttresses extend internally about 0.40m and are about 0.25m thick. Mellaart notes such features develop in the later sequence of the mound (Mellaart 1967:64) and take the place of wooden timber frames. It is indeed impossible to say whether this was the case in B.108, although it seems unlikely as the wall of the building are only about 25cm thick, which is much thinner than the walls of the buttressed buildings in the upper levels.

During the 2008 field season, two Neolithic burials were excavated from within the boundaries of Sp.84. Multiple burial F.6065 was located in the northeastern corner of the space, containing

two adults and four infants (Hager and Boz 2008:134). To its south was burial F.3088 which contained an older adult female and a juvenile skeleton (*ibid.*).

This season work focused on the eastern half of the building in which two more burials were recovered and represent the latest depositional events. Burial F.3622 was located near the northern wall, centrally within Sp.84. The burial contained a flexed child (19437) of 4-6 years, "*placed with (its) head to the west and its back to the north*" (Asa Berggren). Its fill (19436) contained animal bone and small obsidian pieces have came from the midden below as it was cut immediately into it. Burial F.3544 was found immediately south of F.3622 and contained possibly 2 individuals. The relationship between the burials remain unclear, although it is most likely that they were buried underneath a platform, the remains of which have been located abutting the northern wall as layers (19457) and (19482). Layer (19457) was compact laminated yellowish grey silty clay that was about 3.6m wide but only about 0.5m wide, and 0.17m deep, extending form the northern wall towards burials F.3622 and F.6065. Layer (19482) that was beneath (19457) represents what is left of the construction of the platform. Located in the northeast corner of the building and extending about 1.80m to and 0.80m, It was a grey silty clay composed much of compacted rubble that contained quite a bit of plastered surface pieces, including those painted with red. This layer was truncated by both Neolithic (F.6065) and post-Neolithic (F.3085 and F.3084 excavated in 2008) burials.

Another feature that was excavated within the space was a square deposit found in the southeastern corner of the building, 1.6 x 1.5m, abutting the southern and eastern walls. This compact grey silty clay deposit sat above building makeup (19458) that was a greyish brown silty clay deposit with crushed orangish brown mud brick inclusions within it.

The construction sequence of B.108 has not been entirely determined, as its walls have not yet been excavated. A massive construction cut (20439) that truncates the midden and walls F.3679 and F.3646 (see below) may be associated with the construction of walls F.3627 and F.3623. This cut contained fill (19490), a greyish brown silty clay with "inclusions of charcoal and some medium sized red and brown burned pieces of bricks and medium sized hearth/oven fragments" (Arne Sjöström). Bench F.3638 that abutted eastern wall F.3627 was built above fill (19490). It is important to note that F.3627 and F.3623 may have actually predated the construction of B.108, possibly built as retaining walls for the surrounding structures in separate "lifts". It seems as though these walls were then incorporated to the construction of B.108 as foundation walls. A foundation cut (20607) that truncates the midden is related to the construction of southern wall F.3624. The fill of the foundation around the eastern end of wall F.3624 had two distinct layers within it in which a homogenous brown clay (20440) sealed a yellowish grey silty clay (20414). Wall F.3624 was partially excavated revealing a complicated relationship with wall F.3623 that needs resolving in the following season. The yellowish brown clay mud brick (20415) and the grey heterogeneous silty clay mortar (20416) actually bonds with the western end of wall F.3623. Further excavation is necessary to understand the exact stratigraphic relationships in the construction of these walls.

Building 108 did not have a predecessor beneath it. It was built upon midden sequences related to the activities of B.77, B.51 and B.52 (see below). The western half of the building, as well as all of its remaining walls will be excavated in the following season.

Spaces 489, 490 and Space 488

Figure 2.20. End of the season overview of Sp.489 and Sp.488. Facing east.

Building 108 was built upon a midden sequence, which was excavated in its entirety in the limits of the trench allocated for the investigation of B.108. The midden had a complex depositional character that covered spaces 490 and 489 (Figure 2.20). Space 489 was defined to the north, east and south by a series of walls (F.3679, F.3627, F.3623 respectively) and the excavation trench to the west, covering an area about 3.10m wide and 2.60m long. Space 488 was wedged between B.77 and Sp.489. Space 490 represents the latest use of the midden area, in which the accumulation of deposits actually covered both Sp.489 and Sp.488.

The earliest construction event uncovered within Sp.489 defines the northern border of the space. Wall F.3679 built from a silty clay grey mud brick and grayish brown mortar, and most likely belongs to a building that is yet to be uncovered, beneath the rest of the midden still *in situ*. Wall F.3679 has a thick plastered surface on its southern face, which was capped with the construction retaining wall F.3646 within Sp.488. F.3646 was most likely built to keep F.3679 from collapsing on to B.77, which would presumably have been lived in at the time. It is likely that this retaining wall was built half-way through the midden sequence.

Deposits that belong to roof collapse (19581) most likely relate to wall F.3679. These deposits are similar to those found within B.3 (see Stevanovic 2012, 147-8), and will be further examined the following season. Sealed by the midden are two collapsed walls that have not yet been excavated. The lower wall seems to have been built with similar materials to those with wall F.3679. The midden accumulated within Sp. 489 was excavated by a series of arbitrary layers (earliest to latest: 19564, 20487, 20472, 20465, 20460). Finely layered, the deposits consisted of typical midden with a large number of discarded animal bones, obsidian, and clay balls within an ashy charcoal rich matrix. These deposits also produced quite a few small animal figurines, worked stone objects such as broken bracelets, and two bone fishhooks. Layer (19564) contained within it an abundance of eggshell that seemed to have been deposited as a lens about 1cm thick. The fine laminations within the midden were not always continuous and therefore hard to follow. The midden was capped with brown clay at least in two separate events, one clearly seen within unit (20472). The capping may correlate with the construction of retaining wall. F.3646 in Sp.488.

Space 488 is an extremely narrow (0.50m wide) space between Sp.489 and B.77. No discernable floors were reached within the space. However, a single cattle scapula 19580.x1 was placed immediately behind the oven wall (F.3621, see above) of B.77 that protrudes into the space on the earliest level reached. This scapula was found within a deposit that was a mid brown to mid grey silty clay fill, excavated in two arbitrary layers (19580 and 20486). This fill, unlike the midden in Sp.489 was quite homogenous.

In space 489, above the clay capped layer were an accumulation of more midden layers arbitrarily excavated (20465, 20460). Units (20455) and (20449), which were above (20465) and (20460) were excavated as arbitrary midden layers overlying both spaces, and were therefore assigned a new space number, Sp.490.

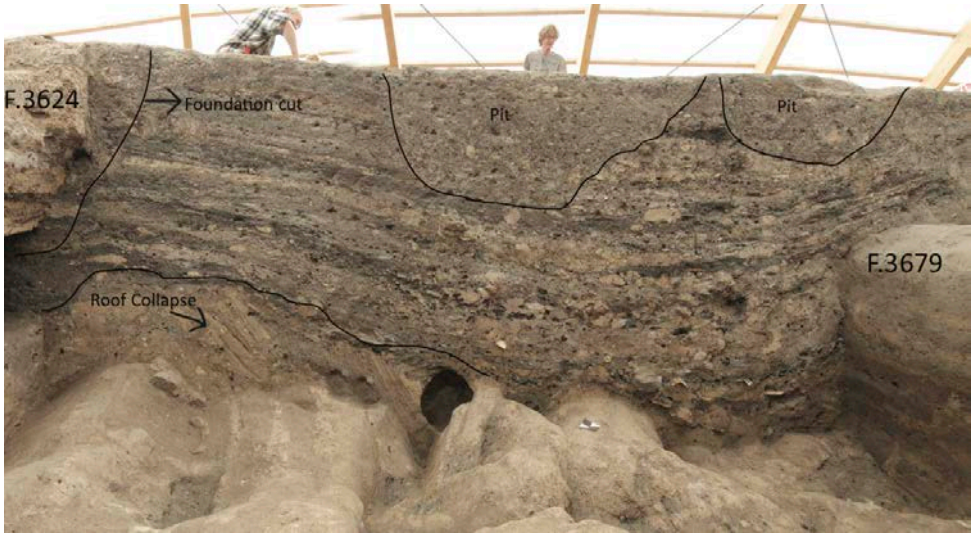

Figure 2.21. Sp.489, facing western section.

The complete excavation of the midden sequence in Sp.489 and infill in Sp.488 produced a section that documents the deposition of the midden (see Figure 2.21). In the section, two later cuts are seen truncating the midden sequence, which were not discovered during the excavation process. In fact, cuts within middens at Çatalhöyük are generally difficult to discern, since the re-deposited material generally matches in colour and texture with the materials produced from the lateral excavation of the very finely laminated midden sequences. In the section, it is clear that wall F.3624, part of the southern wall of B.108 was built on the midden. However, as discussed above, the wall's relationship with wall F.3623 remains elusive.

The material culture found in the midden correlates more with Level G, with its rather limited pottery remains (only a few sherds within the whole sequence) and abundance of clay balls. This was further confirmed in discussion with the lithics team members. It is possible that the midden was in use during the use-life of B.77, B.51 and B.52. B.108 definitely post-dates B.77. One of the aims of the following season will be to precisely understand the stratigraphic relationships within this area. Paramount to this will be the excavation of what seems to be a series of retention walls that flanks the eastern, southern and northern ends of the space.

Building 113

Building 113 was uncovered and partially excavated during the course of the season. It is comprised of two spaces. Space 96 constitutes its main room and Space 95 is its side room. Trapezoid in plan, it measures 7.75m in length, 4.40m in width by its southern end and 6.5m in width by its northern end. The surface scrape of the 90s had very roughly defined the outlines of the building, although the boundary between Sp.95 and Sp.96 remained unclear (Matthews 1996, 84). A geophysical survey conducted by Colin Shell had produced high magnetic readings at the northeastern end of the defined boundaries, showing evidence for burning (Shell 1996, 111). Due to its vicinity being immediately east of B.77, it was initially thought that the burnt deposits within the area were secondary deposits associated with B.77. With full-fledged excavations this season, it became apparent that the burning in fact was *in situ,* related to the burning of B.113.

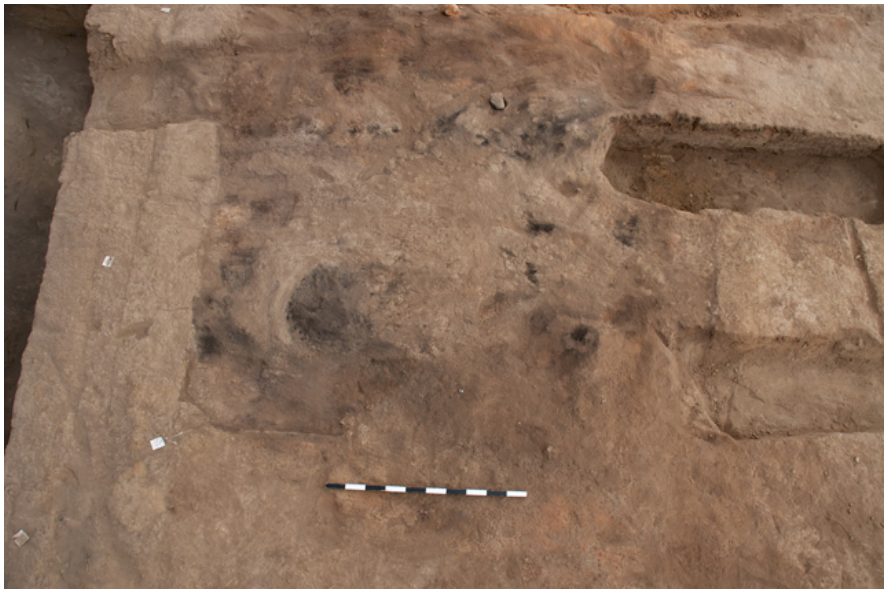

Figure 2.22. Partial overview of Sp.96. The possible oven surface to the south is immediately beneath the scale. There is a kerb to its northwest. The space is cut by three separate post-Neolithic burials. Facing north. Photo by Jason Quinlan.

Being close to the surface, the building and its features were heavily eroded. In Sp.96, remains of a kerb (20605) dividing the northwestern corner of the space from its southwestern corner, a possible fire installation on the southern end of the building, and the remains of a plastered lip by the eastern third of the space were the only ephemeral features remaining (Figure 2.22). Sp.95, which had a surface some 20cm lower than Sp.96 had two very badly preserved and heavily burnt rectangular bins built adjacent to its northern wall (Figure 2.23). Further the building was truncated by a number of Late Roman/Early Byzantine burials that were excavated this season (see below). Burial F.3622 cut the centre of the Sp. 95, while burial F.3640 cut the northeastern corner of Sp.96. The western wall F.3677 was truncated in two sections, by its northern end in Sp.95 by burial F.3641 and by its southern end in Sp.96 by burial F.3631. Further, burial F.3084 that was excavated in 2008 cut the northern end of western wall F.3647 within its boundaries in Sp.96.

The building was cross-sectioned after a few of the upper layers of the burnt deposits were removed. The cross section ran N-S mid-way across both Sp.96 and Sp.95. By the end of the season, a clean infill that most likely constitutes the infill of another building below B.113 was reached on the eastern side of the section, some 15 to 20cm below the preserved earliest surfaces of B.113 within both spaces.

Space 96

Sp. 96 is a trapezoid shaped space, internally measuring 4.75m in length, 3.75m in width by its southern end and 5m by its northern end. It is defined by wall F.3676 to north, wall F.3677 to the east, wall F.7100 to the south, and wall F.3647 to the west. Only the southern wall F.7100 was partially excavated this season. 3.75m in total length, the surviving two courses of mud brick and mortar measured 0.20 to 0.30m in height. The wall was constructed with orangish brown sandy clay loam bricks (19566) about 0.9m in length 0.11m in height and 0.30m in width, bonded together with a grey ashy mortar abundant in charcoal (19565) applied same thickness as the brick. The wall abutted eastern wall F.3677 and was built upon with a 0.12m step inward on a foundation wall. Left *in situ*, it is currently not clear whether this foundation wall is the remnants of wall that would have belonged to a building lying directly below B.113. That the southern wall seems to have been cut in an heterogeneous infill (20468 and 20485) consisting of greyish brown loam with medium frequency of charcoal, plaster and brick inclusions further suggests the existence of a previous building. Unfortunately, the foundation trench for the wall was neither visible during excavation nor in the cross-section. Its worth noting that the mortar of the wall (19565) had a very similar matrix to infill (20468) and (20485). If the wall was built

within a foundation trench, it is quite possible that the removed spoil by the trenching was used within the mortar of the building. Located south of the wall F.7100 is wall F.7104, most likely a support wall for the B.52 'complex'. While further excavation is required to reveal the true nature of the relationship between these walls, in-between wall infill (19590), was typical with its loose consistency and high inclusion frequency of discarded obsidian and bone.

An interesting feature in the southwestern corner of the space, adjacent to an orangish gray bricky infill (19584) and the western wall F.3647 is an large platform-like structure (20431), 1.54m in width and 1.27m in length, made from five blocks of bricks each measuring 1.20m in length and 0.30m in width placed next to each other. The bricks are slightly lighter in colour than those used in the construction of the southern wall. This feature was excavated on its eastern end where the cross-section of the trench fell. The brick that fell to this side was 0.12m thick. Make-up layer (20463) (see also below) abutted this platform-like structure by this eastern end, showing that this feature was built earlier than the makeup. This brings to question whether this structure may have been an outside-space, similar to the mud brick paving found in the IST area south of B.63 (Özbaşaran and Duru 2008, 87-8). In fact the western most brick seems to have been cut by wall F.3647. However, it will be impossible to tell without excavating the feature next season.

Abutting the platform-like feature (20431) and western wall F.3647 is kerb (20605) forming a division between the north and southern ends of the space. Extending only 1.5m into the space, it must have been a division used in an earlier phase of the building as burnt surface (20429) was immediately above the kerb, slightly spilling over the northern end of (20431). Layer (20429) was an oval surface measuring 1m in length and 0.60m in width and 0.04m in thickness. The deposit consisted of multiple layers made up of floor surfaces make-up. It may represent the extremely eroded remains of a fire installation. Layer (20429) was adjacent to (20458), another composite heavily burnt layer that covered the northwestern and central part of the space, extending some 3m in length and 3m in width and 0.5m in depth. While the layer was clearly defined to the north and the west by walls, its boundary to the east was diffuse, having been cut through by two post-Neolithic burials. Within it, two clusters of charcoal were found (20458.s3 and 20458.s4) (see Figure 10.1), of which 20458.s3 appeared to be a carbonized single plank split from a tree 40-50cm in diameter. Sitting in an ephemeral bed of make-up, it is possible for these charcoal remains to belong to roof planks that collapsed during the intense burning of the house. Immediately above (20458), following the same plan was layer (20447). Similar in composition and being heavily burnt, (20447) may in fact be same as (20458), containing heavily burnt but very patchy surfaces, with an abundance of charcoal, both large and small pieces. Layer (20417) covered both (20429) and (20447) and makes up the latest Neolithic deposit in this area. Extending 3.40m north-south and 2.90m east-west, this ashy, charcoal and rubble rich deposit seems to drop into Sp.95. These layers that showed evidence of burning rested upon a silty clay gray make-up layer (20463), which abutted the mud brick platform-like structure (20431). Unit (20463) was the point in which the building was cross-sectioned. It was impossible to understand exact nature of the layers that contained evidence for conflagration (20417, 20447, and 20458). Each layer, roughly the same thickness (0.05cm) had an abundance of charcoal related to collapse and some patches of surface that could have been floors.

Having excavated through the building's eastern half, it is possible to say that space 96 was most likely quite short-lived as there was no evidence of thick plastering anywhere within the space. Unfortunately being so close to the surface, heavy bio-turbation and post-Neolithic activities have heavily damaged much evidence on the nature of the fire that took place within this area

of the building. In any case, the burning seems to have actually started in Sp.95 (see below) and quickly migrated towards the northeastern corner of Sp.96.

Space 95

Trapezoid in shape, Sp. 95 internally measures about 5.40x2m. Defined by walls on all sides, it was very distinct from its surrounding with its orange rubble marking heavy burning. The earliest deposit reached in the space was a brown sandy loam makeup that was part of the construction of the building. Above this makeup sat bin F.3649 that abutted the northern wall towards the western end of the space. This rectangular shallow bin was about 0.75m wide and 0.60m long, its construction (19576) preserved only about 0.05m. Its fill (19571) *"consisted of a homogenous brown clay silt [that] was layered at the bottom, where many phytoliths were found"* (Asa Berggren). A pointed wooden tool (19571.x1) made from pistachio burnt *in situ* was found in the northeastern corner of the bin, placed parallel to its eastern wall (see Figure 21.2). Bin F.3650 situated immediately west of bin F.3649 actually partially cut its western wall. F.3650 was a squarish bin with rounded corners preserved up to 16 cm in height. Within the infill of the bin (20459) was a collection of wild mustard seeds that were burnt *in situ* (see Figure 21.3), described below:

Figure 2.24. The western end of Space 95 and bins (F.3649 and F.3650). Facing North. Photo Lauren Sweet.

"A large lump of charred mustard seeds was found at the north wall. The seeds were wrapped in something before burning, as the lump was flat and oval in shape, as if they were kept in a wrap… The lump was 26cm long, 9cm wide and 5cm thick." (Asa Berggren)

Bin F.3650 was built upon floor (20491) that extended into the rest of the room, and was rather badly preserved. This floor actually abutted F.3649. The floor was layered and heavily damaged due to the burning.

Figure 2.24. Burnt rubble wihtin Space 95. The larger pieces of rubble form a straight line, as if toppled over where the division wall between Sp.95 and Sp.96 would have been.

Above the badly preserved floor, overlying both bins was layer (19476) that represented the burning collapse within the space, which covered the whole space. The western end of the space had an accumulation of pinkish rubble which gave way, towards the central area of the space to a more orange rubble. Beneath this pinkish and orangish rubble was an accumulation of a very friable ash rich deposit that was excavated as the same unit. The

rubble consisted of burnt plaster, some mud brick, but mostly pisé-like/daub construction, similar to those found within B.52 (see Stevanović 2005, 234-5). The pisé-like/daub construction was in a variety of forms, from rectangular pieces to those that were irregular and resembled corner pieces. The regular rectangular pieces were laying within the fill in a straight line, and may be part of the space division and passage way between Sp.96 and Sp.99 (Figure 2.24). A horncore (19476.x2) was found to the south of the greatest concentration of the rubble, near the possible passage way between the two spaces. Three obsidian blades (19476.x1, 19476.x3, 19476.x4) and a ground stone (19476.x6) were found within the rubble.

Discussion

B.113 seems to have been a short-lived building. The nature of the conflagration that took place within the building remains to be resolved. Its contemporaneity with the burning events of B.77 and B.52 remain unclear at this stage. If floor levels are any evidence to time-depth within the Northern Area's Neolithic sequence, the burning of B.113 is surely a later event. However, surface levels in the North Area do not correlate with time-depth (Farid, 2008; *forthcoming*), and there remains much work to be done to understand stratigraphic relationships between buildings. Unlike other burnt buildings (such as B.77), few artifacts were found *in situ* within the space.

The post-Neolithic activities in the space as as well as the heavy bio-turbation mostly caused by rodent activity render much of the contexts within B.113 insecure for dating purposes. Nevertheless, the mustard seeds found within one the bins may be valuable to use in dating for future reference.

Space 99

Another new area of excavation this season was Space 96, located east of B.113. This season, most of the work within the space focused on the removal of surface material and slope wash that contained post-Neolithic and Neolithic material culture (20465). Four post-Neolithic burials (F.3633, F.3641, F.3685, F3687) that truncated layer (19596) which was a mixed layer that sealed a bricky infill to the northern end of the space and a midden to the south of the space. The nature of these deposits will further be investigated in the following seasons.

Post-Neolithic Burials

This season, 8 post-Neolithic burials containing 9 individuals were recovered from the newly excavated portions of the North Shelter. Seven of these burials were located in the newly opened areas between B.3 and B.49, all oriented east-west, with individuals heads placed to the west and feet placed to the east. One particular burial (F.3697), containing two individuals buried together in a north south orientation with their heads to the south and feet to the north, was located within the boundaries of B.112. Almost all of these post-Neolithic burials were coffin burials, evidenced by coffin nails found within them. All burials, except for the anomalous north-south burial were capped with grey mud brick. Most of the graves contained grave goods, either in the form of some form of glass or ceramic unguentaria (e.g. F.3685, F.3689) and/or cosmetic related items such as bone hairpins or earrings (e.g. F.3622, F.3685, F.3689). Those that contained the cosmetics all were adult female burials.

Most of the burials within the North Area discovered this year fall into Moore and Jackson's (*forthcoming*) Group I category burials that have largely been dated to the 1st and 2nd CE based on the glass and ceramic assemblage. Only two other north-south aligned Post-Neolithic burials were discovered at Çatalhöyük. Burial F.3007 belonged to a juvenile who was buried with a glass

vessel was located within Foundation Trench 7 while F.158, which contained an adult skeleton with multiple ceramic vessels truncated Sp.89 (Cottica et al. 2012, 342). In all burials, as in F.3687, the heads of the individuals were placed to the south.

The burials, with focus on their typology and depositional sequences are discussed individually below.

F.3631

This burial belonged to an adolescent, which was missing its skull.

> *"It is possible that someone had dug into the burial fill at some point and retrieved the head of the dead body. This 'head retrieval pit' left a softer material for an animal to burrow in, which may explain the extent of disturbance in that area of the burial. No skull fragments were found in the disturbed area, which indicates that the head was gone by the time the animal disturbed the area. However, teeth that were found near the ribs shows that the head has been present [during burial]"* (Asa Berggren)

The individual was placed within a coffin as a few coffin nails were found, two of them *in situ*. The rectangular cut was some 0.25m deep. After the coffin was placed, it was most likely capped with grey coloured bricks, although much of it was disturbed. This burial cut through two Neolithic walls, F.3677 which is the eastern wall of B.113 and F.3678 that defines the western border of Sp.99.

F.3632

F.3632 was cut directly into the burnt rubble that filled Sp.95, and was immediately recognized by its grey mud brick capping. Skeleton (19456) belonged to a female adult, who had evidently been buried with a coffin recognized by a single nail found within fill (19445). The individual was buried with a bone object (19445.x1).

F.3633

This was the burial of a sub-adult (19454) whose skeleton was not well preserved. Cut (19474) was rectangular in shape with steep sides with a sharp basal boundary. Perhaps the skeleton's bad condition was due to its shallow depth. It contained fill (19446), which was grey in colour, representing a very badly disturbed mud brick capping. No burial goods, or iron nails were found in association with the grave.

F.3640

Found within Sp.96, burial F.3640 belonged to a poorly preserved adult (20426), buried within a coffin. The cut for this burial was rectangular with steep sides, and was relatively large (2.30 x 0.70m, 0.45m deep). Sk. (20426) was capped with grey mud brick (19498), which formed a "false-bottom" for the grave. A Neolithic obsidian point 19498.x1 was found sitting on the capping aligned with the individual's chest. The placement of the obsidian seemed intentional although there was some animal burrowing around it. It is also possible for the point to have been found within the fill that was removed to inter the individual, and simply put back in the grave as a token. The mud brick false-bottom was sealed by fill (1983) which was some 40cm deep and contained a few late-period pottery sherds.

F.3641

The burial of juvenile skeleton (20402) was cut into the eastern wall of B.113 and western wall of Sp.99. The rectangular regular cut (20427) contained a coffin burial, which seems to have been

covered with an extremely firm mud brick (19487). A small glass vase (19478.x1) was placed by the feet of the individual.

F.3685

Figure 2.25. Mud brick capping of F.3685. Photo by Lauren Sweet

Located within the confines of Sp.99, F.3685 was a burial that belonged to a sub-saharan African adult female (see Figure 8.8). Skeleton (19569) was placed, within a coffin in a deep rectangular cut (20484). The cut was one of the deepest post-Neolithic burial cuts excavated this season being more than 1m deep. The fill surrounding the skeleton, layer (19568), had a deep brown colour and was soft, contrasting the mud brick capping (20499) that was immediately above it. This capping was sealed by layer (20480), which was a firm infill about 0.50m deep. It seems as though considerable effort was made to make sure the burial would not have been disturbed after its interment. A puzzling find within this burial was a charred thin wooden plate covering the face of skeleton (19569) (see Figure 21.4). With no other evidence of burning surrounding the skeleton, it seems as though the rectangular plate was intentionally burnt before placed upon the face (*see chapter 21*). Two ceramic (19568.x12, 19568.x13) and one glass unguentaria (19568.x11) were placed by her head, and two bone pins about 15 cm long lay by her feet (19568.x14, 19568.x17). 24 nails were recorded as x finds related to infill (19568) and make up the most amount of nails recorded within a single grave this season.

F.3687

Cut into the confines of Sp.40, F.3687 was a north-south oriented coffin burial, which contained two individuals buried together (see Figure 8.9). The individuals were buried with their head to the south and feet to the north. This is the first post-Neolithic multiple burial found at Çatalhöyük. An older adult female (20495) was placed above a younger adult male (19577). Two glass unguentaria (20493.x17, 20493.x18) were recovered by their heads. One of the individuals was wearing a bronze ring that contained a stone engraving (20493.x7). Copper plates, and a ceramic unguantharium (20493.x13) were recovered by their feet.

F.3689

Burial F.3689 was located immediately north of B.49 within Sp.99, and was cut into surface that sloped eastward. Cut (19573) was rectangular in shape about 2m long, 0.70m wide and 0.5m deep. Containing the skeleton of a young adult female (19587), this burial had further evidence of the use of coffins other than iron nails. Layers (19585) and (19586) that sealed the skeleton actually had imprints of the coffin pressed upon them. It is possible that the imprints were formed due to water seeping into the burial to create which created a puddling effect where the clay content of the fill took the shape of the overlying lid. The burial may have been somewhat exposed to elements before full interment, and its placement in the slope could have played a role in the deposition of the water. The burial was capped with grey mud brick (19572) that was

badly eroded. This capping was sealed by (20490) which contained Skeleton (19587) was buried with a glass unguanthorium by its head, and a bone object by its feet similar to F.3685. Further, the individual had copper earrings, an iron ring and a necklace that had extremely friable beads.

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3. Excavations in the South Area, 2012

James Taylor, University of York

Introduction

Excavations in the South Area continued from the previous season's work with a continued focus upon the 'southern ledge' of the shelter. Here all the work was concentrated within buildings, including Buildings 43, 80, 89, 96, 97 and Spaces 492, 470 & 487 at the western end. Most of these structures were thought to have been constructed at a broadly contemporary horizon (Figure 3.2). As well as continuing the conservation work on the eastern wall of Building 80 and minor removal of some structural elements, work continued on the ongoing excavation and experimentation of digital recording in Building 89. Excavations were resumed in Building 96 (untouched since the 2010 season) and Building 43 (untouched since 1995) as part of the larger strategy to expand the area of exposure of earlier occupation levels centered around the deep sounding, with a view to increase our understanding of some of the earliest activity and structures upon the site.

Another key element in the excavation strategy this season was the work in Building 97 (first exposed in 1962 as E.VIB.28) and the Building 7 (Mellaart's Shrine 8), so-called 'annex' sequence (Spaces 492, 470 & 487). Here, work begun in 2010 was continued in a concerted effort to bridge a gap in the sequence between Mellaarts stratigraphic findings and our own interventions to the north of the south shelter and the southernmost sequence, which has been the focus of the last several years work in the south.To the west were a series of external areas of finely lensed midden and trampled surfaces excavated last season as Space 369. To the east work began in Building 89, which was defined in 2009 below Building 76 (see Archive Report 2009). Finally unplanned work took place in Building 80 on the exposure of a wall painting on the east wall.

Building 43

Contribution by Justine Issavi (Stanford University)

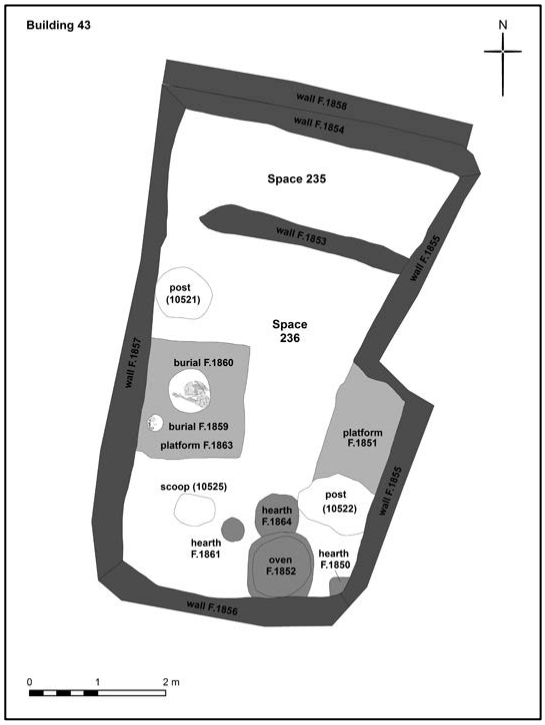

Figure 3.1. General plan of Building 43 (illustration by Camilla Mazzucato).

Building 43 (Figure 3.1) was originally excavated down to occupation level in the 1960's by Mellaart as E.VIII.27. Although very little is reported on this building, the building's internal features generally correspond with Mellaart's plan of the building (Mellaart 1966). In 1995, a small section of this building was exposed and recorded in section (Matthews & Farid 1996). In 2004, the building was completely exposed and excavations resumed at the horizon left by Mellaart. Two burials (F.1859, F.1862) were removed from a platform (F.1863) abutting the west wall (F.1857) of the building. Additionally, two post-retrieval pits were also excavated, one near the western wall and the other near the southeast corner of the building. The 2004 excavations, however, were mainly focused in the southern area of the main room.

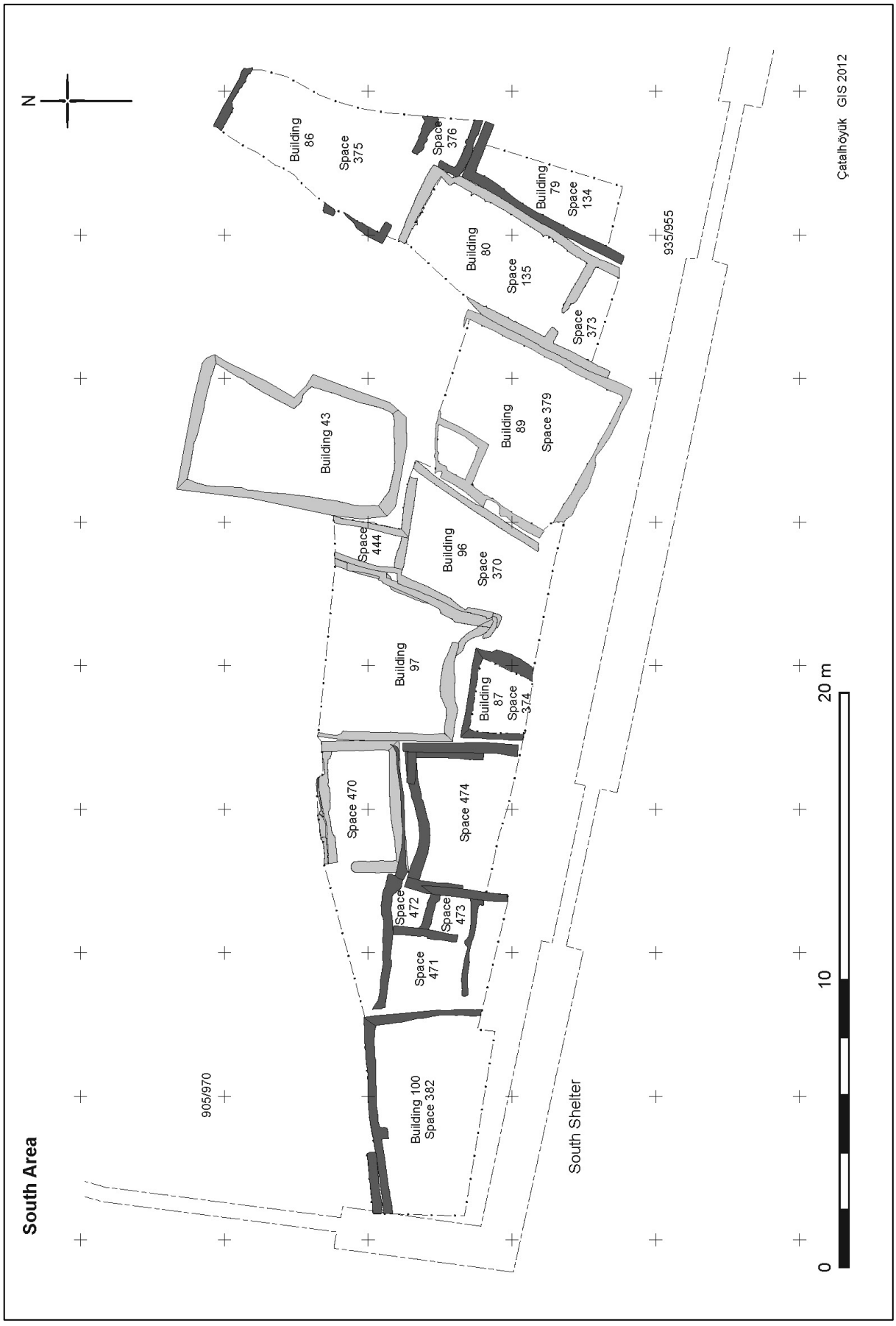

Figure 3.2. General plan of the 2012 season South Area Excavations (illustration by Camilla Mazzucato)

The 2012 excavation of building 43 began on July 20th, 2012 and lasted through the end of the field season. The building was severely eroded as a result of its long period of exposure. Consequently, the interior of the building walls has been stripped of its plaster and multiple phases were exposed throughout the building in patches. The main goal of the building's excavation was to bring the building in phase in preparation for its removal.

Building 43 has an irregular shape and sits on a north-south axis. The eastern wall has a 'dog-leg' break. It is divided into two rooms, a narrow room in the north (Sp.235) and the main room to the south (Sp.236). The two rooms are divided by a partition wall (F.1853) that abuts the eastern wall of Building 43 (F.1855); the partition wall, however, does not meet the western wall of the building, as a narrow doorway exists between the two.

Space 236

Figure 3.3. Overview of Space 236 and Space 235 (photograph by Jason Quinlan).

Space 236 consists of the main southern room of the building and at one time, it contained 3 platforms. The remains of the northeastern platform (F.1866) previously excavated by Mellaart and possibly truncated in 2004, can be distinguished by an orange make-up layer and bricks and mortar (see Figure 3.3). A few skull fragments have been revealed through erosion, but no other grave cuts have been revealed. This platform extended west as far as the partition wall F.1853.

Platform (F.1863) abuts the western wall and was partially excavated in 2004. Another platform (F.1851) sits directly across, abutting the eastern wall along its eastern, as well as its northern edge, as this platform is nestled along the 'dog-leg' portion of the eastern wall. This platform has not yet been excavated, but is cut by a post-retrieval pit on its southern edge. The 2004 excavations had also identified and partially excavated an oven (F.1852) as well as three hearths (F.1861, 1864, 1850) in the southern part of the room.

Northern Area

A unifying orange make-up layer was uncovered (but not excavated) throughout most of the main room. This make-up layer abuts the partition wall in the north and extends south all the way to the edge of the hearth (F.1864). This layer seems to predate the construction of all of the platforms in the main room, including the unexcavated platform (F.1851). Three other make-up layers that existed in patches throughout the room sealed this orange make-up layer in. Sealing a part of these make-up layers was a patch of clean floor plaster (10539) that was cut by a post-retrieval pit (10521). The significance of this clean plaster lies in it being the only surviving patch of clean plaster uncovered in this building so far (see Figure 3.4).

Figure 3.5. Detail of plaster floor, U.10539 (photograph by SK).

Figure 3.4. Detail of niche (F.1865) in eastern wall of Space 236 (photograph by AMA).

Very little floor plaster remains in this part of the room. Most of the plaster consisted of patches of floor layers that were severely damaged by the erosion and dispersed throughout the main room. These patches were therefore grouped together and treated as one unit (10538), as a stratigraphic relationship could not be established for each patch of plaster.

A niche (F.1865) was found while cleaning the eastern wall directly above platform (F.1851) (Figure 3.5). The niche has an oval shape with a length of 0.90m and height of 0.18m and extended 0.09m into the wall. The niche deposit (10547) was sterile and no placed objects were found within the niche. According to the section revealed by the post-retrieval pit cutting into platform (F.1851), the construction of the niche should predate the construction of the platform, but we will not be able to confidently establish this relationship until the platform is excavated.

Southern Activity Area

Bordering the southern wall, an early phase of the oven (F.1852) was identified (see Figure 3.6) but not excavated beneath patches of dirty floors (10556). In the southeastern corner of the room an obsidian cache (10558) was found consisting of mostly debitage and small flakes, sealed by the same patches of dirty floor. The southern activity area of building 43 has also suffered from severe erosion. Subsequently, a number of these dirty floor patches were grouped together into one unit. Sealing these dirty floors were a number of strata (10551, 10552 & 10554) that could best be described as eroded materials because of their deteriorated

Figure 3.6. Detail of oven (F.1852) and surrounding floors in Space 236 (photograph by Jason Quinlan)

state, although they were most likely make-up layers for later floors.

The aforementioned layers were cut by hearth (F.1864) that bordered the oven on the northern side and measured 0.6m across and 0.27m deep. This hearth was identified and partially excavated in 2004; we continued excavating the hearth and were able to find the hearth cut (10553). The hearth seemed to have multiple phases of use, as it was lined and re-lined multiple times. The hearth deposit (5902) mostly consisted of ashy deposits with animal bones and charcoal inclusions.

A possible crawl hole was uncovered towards the south end of the western wall. The visible plaster lining the feature as well as different colored bricks and mortar within that lining helped identify this feature. We were not able to excavate this feature as it was found towards the end of the field season. This feature was sealed by a layer of room fill (10557) that had been left along the western and southern walls, culminating in the southwestern corner of the room. The room fill along these walls (with occasional animal bone, stone and charcoal inclusion) also continued unto the floor in the southwestern corner of the building and sealed the eroded material and patchy plaster floors in the southwestern corner of the room.

Space 235

Very little work was done in space 235 (the narrow northern room of Building 43) during the 2004 excavation, as the work mostly consisted of reaching Mellaart's horizon by removing the backfill from the room.

The room contained two pits that were excavated this year. One of the pits (10550), placed along the northern wall (F.1854) of the building and measuring 0.32 across and 0.12m deep was relatively circular and could possibly be identified as a post-retrieval pit, as its location seems to mirror the location of a post in Mellaart's plan of the building. This pit's fill was relatively sterile and had few inclusions (mainly animal bone and specks of charcoal—with one notable groundstone inclusion). The other pit, located along the northern side of the partition wall (F.1853) and measuring 0.58m across and 0.18m deep, also had a groundstone tool within its fill. Two patchy layers of floor make-up, also severely affected by erosion, sealed both of these pits. Similar to the main room of the building, very little floor plaster remained in this space. Small patches of plaster, grouped into one unit (10543) were concentrated towards the western edge of the room and sealed the make-up layers.

During this season, the decision was made to partially take down the northern wall (F.1854) of building 43, along with the abutting wall (F.1858) in order to create a safe access and egress route for the building. The northern wall (F.1854) was partially recorded in section and taken down approximately 1m at its western end. Wall (F.1858) was wholly recorded in section and was also taken down approximately 1m at its western end. Wall (F.1858) was severely eroded along its southern face and crumbled very easily. The fill between the two walls (10537) was very distinctive and contained many inclusions typical of such a context (such as bone, clay balls, stones and charcoal).

Building 80 and the final removal of Building 76

(by James Taylor and Justine Issavi)

Introduction

Building 80 is situated towards the eastern end of the South Shelter, between Building 79 on the east and (the now excavated) Building 76 and underlying Building 89 sequence on its western side. Building 80 itself is orientated on a broadly northeast-southwest layout; as such it was bounded on the western, northern and eastern sides by walls F.5036/5039, F2533 and F.5014/5040 respectively. With its long axis orientated northeast-southwest, Building 80 was a broadly rectangular structure some *c.*9.30m long by *c.*3.20m wide. Previously in the 2009 and 2010 field seasons it was excavated down to the latest floors (see Archive Reports 2009, 2010). Subsequently paintwork was discovered predominantly upon the eastern wall in 2011 (see Archive Report 2011) and concentrated efforts have been made in the last two field-seasons to expose and conserve this painting (see conservation report in Archive Report 2011 and Lingle, this volume). Strategically however Building 80 is relatively low priority in terms of excavation, sine it is not related to the central sequence of the shelter and it is not directly tied into the spine of stratigraphy that are so crucial to the C14 Dating project (see Bayliss and Farid, this volume).

Nevertheless, some structural elements were excavated within Building 80 this season for a couple of reasons. Firstly work continued on the western wall of the structure (F.3525), and the adjacent wall (F.3451) belonging to Building 76, which was started last year, with a view towards making the eastern side of Building 89 safe to work in immediately below. The conservation team noticed some cracks forming in the Building 80 walls and the remaining contemporaneous Building 79 walls (which immediately sealed Building 89 and for various reasons remained *in situ* on this eastern side) and so the stability of the upper part fell into doubt. We decided remove the remnant Building 76 walls and foundations until the top of Building 89 was completely exposed along this eastern side, and to completely remove the Building 80 wall to about 100mm (approximately one whole brick course) above the *in situ* floors (thus preserving the relationship between wall plasters and floor surfaces should excavation take place there in the future).

The second focus of excavation work in Building 80 was the north wall, which had been reinforced by sandbags and obscured since its exposure in 2010 due to an obvious and potentially dangerous lean inward (to the south). However the conservation team needed to ascertain whether any Neolithic paintwork extended along the northern registers of the eastern wall, or indeed was present on the north wall itsel F.So we decided to stabilise the wall by removing the sandbags in safe steps and reducing the wall to a safer (more stable) height. This section outlines the findings of these two excavation works, for further information about the painting and conservation efforts see Lingle (this volume).

The North Wall

As already stated, the north wall was excavated to ensure the safety of conservators working inside B.80 to ascertain the potential presence (or not) of Neolithic paintwork on both the northern wall (F.2533) itself and on the northern registers of the eastern wall (F.5014). The latter wall was deemed safe and was not excavated as part of this process.

Dismantling of the north wall (F.2533) took place in stages, whereby a section of retaining sacks were removed from the northern face, to create a work platform and expose a manageable

portion of wall (no more than a meter at a time). The excavators, prior to removal of the wall examined the plaster, with the following observations being noted:

> *"The very first plaster layer, which touches the wall, seems to be a kind of fixation or preparation layer as it is slightly thicker and more grey than the following layers of plaster. In the eastern part of the wall the layers were thinner, suggesting that it has not been repaired as often as the rest of the wall. Close to the architectural feature of the niche (18985) and the wooden pillar imprint the layers of plaster were slightly thicker and more compact, making them more difficult to remove. The layers themselves were very uniform. No signs (so far) of pigment. We removed 60cm below the horizontal groove to an elevation of about 1009.65" – Extract from 2012 database entry LS/GE.*

After removal of the plaster above the decorative linear incised band (18985 – which contained some evidence of red paint in its own right) either side of the central upright post the wall (F.3422) was dismantled and left at a height of approximately 1.80-2.00m above the highest floor surfaces. At this point the wall was flush with the unexcavated deposits in B.86, Sp.344 to the north and was deemed stable enough to allow work on the inside of B.80. The mudbrick 12891 was a fairly homogenous mid grey-brown clay silt (containing bone, shell and obsidian fragments and some indication of organic imprints) and in places almost indistinguishable from the mortar (12892). This made it hard to distinguish the coursing at certain points, particularly at the coursing level with the incised band (18985), which may be related to the construction of this decorative feature. There was some indication of wood imprints in the underlying mortar, although how these might have affected the overall structure of B.80 isn't clear at this point.

The West Wall

Note on structure phasing

This year, excavations continued on the abutting walls of B.80 and (residual) B.76, west of B.89. As noted above excavation was initially begun in 2011 with the purpose of reducing the height of the two walls in order to create a safe work environment for the excavators in B.89 below and to the west. The walls were to be excavated in sections, so that a cross-section of the two walls could be revealed and cleaned in order to examine and possibly establish the order of construction of the two walls. However, excavation could only confidently establish an abutting relationship between the two walls, there was no evidence of any construction cuts for either structure, and the 'between wall fill' (19802) provided no other indication of order of construction.

Figure 3.7. Detail of the southernmost section of the west wall of Space 135, showing paint patches and signs of burning (U.19806) (photograph by Jason Quinlan).

B. 80: Space 135/space 373

The western wall of the northern space of B.80, (Sp.F.5036 was taken down to floor level (sFigure 3.7). Although the excavation was strategic and not *in phase* with the rest of the building care was taken to remove all units stratigraphically and to note any stratigraphic relationships with the remaining *in situ* structural elements. The excavation of the wall also exposed and removed the top half of the niche adjacent to the pillars in the centre of the west wall

(niche: F.3443, pillars: F.3433). Careful examination of the niche during excavation revealed that it did not cut into the eastern wall of adjacent B.76 (F.3401) reiterating the abutting relationship between the two structures.

Prior to the removal of the southernmost plaster panel on wall F.5036, a few specks of paint were found and recorded. However fire damage to the wall in antiquity and subsequent consolidation conducted by necessity in 2010 made it impossible to identify any coherent patterning in this decoration.

To the south of the building in Sp.373, wall F.5039 (which was found to be an extension of wall F.5036 in the northern space) was also taken down to floor level, although the floor level in Sp.373 was *20cm* higher than in Sp.135.

In addition, the western part of the internal partition wall (F.5037) separating Sp.135 in the north from Sp.373 at the south also had to be taken down approximately 60cm in order to allow the safe removal of the west wall of the building. This wall was found to have an abutting relationship with (F.5036/5039) and was likely inserted after the outer walls of the structure were constructed. However, there could not have been a considerable gap in the construction of the two walls as it still predated the plastering of the internal faces of the building, no plaster was found in-between the abuttal.

Building 76

Figure 3.8. North facing section through B.80/B.76

Figure 3.9. East facing through B.80/B.76 walls, clearly showing 'between wall fill' (19802).

The eastern wall of B.76 (F.3401) was also removed down to its foundation, the walls (minus plaster – which was excavated in 2009) were all that remained of the structure that sealed Building 89 (currently under excavation), and were left *in situ* for this extended period because they exactly respected the footprint of the earlier building which they overlay (Figure 3.8). The composition of the wall was a reddish brown sandy clay mudbrick, containing small amounts of highly fragmented bone obsidian and shell (19811) and mortar (19810).

At the southern end o both B.80 and B.79 approximately 1.00m of both walls was left unexcavated, so as not to compromise the integrity of the shelter, after documentation this section was sandbagged.

B.80/B.76 between-wall fill

Excavation of these two structures revealed a very distinct fill between the two walls (19802). This deposit, a mid-dark grey 'sandy clay-silt' with charcoal flecks and bone fragments, was distributed unevenly throughout the length of the void between the two walls (F.3401, F.5036). Although cross sections through the fill clearly showed that it sealed both walls it did not help establish a stratigraphic relationship between B.80 or B.76, or indeed any overlying spaces from higher in the south sequence, as the deposit was sealed by the natural distortion and slumping together of the two walls that it sealed (Figure 3.9).

This unit was declared a priority unit because of the presence of charcoal throughout as well as some notable clusters of animal bones, ground and chipped stone. In total it contained two clusters, the first (19814) was the articulated animal of a juvenile dog. The second (19818) was essentially an artefact cluster comprising articulated animal bones, ground stone, chipped stone, and some charcoal/archaeobotanical remains. In fact priority feedback revealed that although the chipped stone was deemed to have "two of those 'characterful' objects that one associates with placed deposits" (Carter *pers.com.* from field notes by JI, 2012), there was little else of great interest within the cluster. Notably however the parent deposit (19802) yielded a wooden Juniper bead from the flotation sample.

Building 89

Introduction

This season saw the continuation of work in B.89, Sp.379. Here the team from UC Merced, California, aimed to get to the primary occupation sequence, in phase by removing the remaining quadrants let *in situ* at the end of last years excavation. Furthermore the team continued to experiment with various techniques of digital data capture and recording, with a continued focus upon 3D Technologies as well as the additional experimentation this season with tablet technology in the field (see Forte, this volume).

Space 379

Figure 3.10. Northeast facing end of season photograph of Building 89, showing exposed room furniture (photograph by CF).

A number of characteristic items of room furniture were identified by the end of this years excavation of Sp379, which characterise the latest phase of occupation and represent the lowest part of the stratigraphic sequence identified to date. These include a bench and two large platforms in the eastern side of the space, as well as a significant hearth structure in the south central area, although as yet these remain unnumbered and unexcavated as they are not yet fully exposed (Figure 3.10). Curiously the western side of the space appeared to be cut, or at least a significant north-south orientated linear break in the deposits was noted, separating the sequence in the main eastern part of the room (*c.*6.07m north-south by *c.*4.20m east-west) from a *c.*1m wide strip in

the west. It is possible that this distinctive linear strip or zone in the western part of the space may not be a cut at all, but could represent an, as yet not-understood western space, perhaps arising as a result of an earlier partition wall (examples of this have been seen elsewhere – such as in B.97 this volume, where the western part of the building is defined by charred postholes as a separate storage space).

Excavation in this western part represented the deepest and earliest part of the stratigraphic sequence removed this season. Several possible floor surfaces and makeup deposits were identified, although little can be said of them since they remain unexcavated at the end of season (19856 & 19857). Numbers were also provisionally added to some of the other marl plaster floors and make-up deposits identified in the room, although stratigraphically these cannot be definitively situated yet as they remain unexcavated at the end of season (these include [19855] & [19836]).

Throughout the space a number of probable post-retrieval pits were identified, although again these remain unexcavated so their precise function is speculative. They have been interpreted tentatively as post-retrieveal pits, because they all appear to contain similar types of silty-fill with clear plaster fragments (possibly the remnants of plaster which adhered to the post when it was standing), and also because of their layout. With one notable exception they are all adjacent to an external wall and situated at the juncture of key features in the space, typically between benches and platforms, and correspond with post scars on the wall. Against the eastern wall there were two (F.3465 south & F.3468 north), against the northern wall another two (F.3467 east & F.3470 west), with one against the eastern wall (F.3469); the exception being in the centre of the space (F.3466). Again, because they were not excavated little can be said about the morphology of the 'pits' except that they were all apparently irregular sub-rounded features in plan, with widths ranging from 0.50m in the smallest up to 1.98m in the widest; although it should be noted that the larger of them may be obscured by overspill of the fill.

Little else can be said of the pits at this stage except that it is worth noting that the fill of F.3467 (19846), the easternmost pit situated against the northern wall of the space, yielded a single human mandible (19846.x1). Although initially thought to be in the overlying room fill (19850), it became clear upon excavation that the mandible was clearly embedded in the underlying pit fill, protruding slightly upward. The mandible was notable because it contained evidence of plastering, suggesting that it may have been curated post-mortem (see Human Remains, Ch.8) and deliberately placed in the pit (although this interpretation remains speculative until the fill of this pit is fully excavated next season).

Sealing these pits, inside the linear 'cut' that defines the differences limited to the western portion of the space and the underlying floors that they cut, were the earliest fully excavated deposits in the sequence that were identified as room fill or part of the deconstruction / abandonment of the house. The earliest of these was (19850), which was a mid-brown clay silt dump situated in the north-west corner of the space. This deposit marked the beginning of a sequence of dumps that were concentrated in this north-west corner. Sealing it was unit 19849, a lighter more yellowish-brown clay silt, and this was topped again with a lighter, bright yellow-brown clay silt deposit (19827). This latter unit was characteristically dumped to form a clear mound of material, which is unusual when compared to room fill deposits seen elsewhere upon the site which tend to be spread around more evenly across the spaces that they fill. Furthermore, (19827) was not only homogenous but almost completely sterile as well, lacking the flecks of brick and plaster fragments often found worked into 'conventional' room fills (such

as they are). Indeed this particular dump closely resembled the building material which is commonly used to make up the core structure of platforms and benches, prior to their final plastering; this lead to speculation by the excavation team that it may in fact be a reserve of building material, prior perhaps to some later building event.

Figure 3.12. Partition (19817) and dumping (19827) in B.89. Photo by CF

Figure 3.12. Detail of partition (19817) and dumping (19827) in B.89. Photo by EB

The situation of this 0.30-0.40m mound of dumping in the north-west corner of the space was perhaps more interesting because of its proximity to (19817), which although identified as being **much** higher stratigraphically, may in fact be much earlier (Figures 3.11 and 3.12). (19817) appeared to be an *in situ* plaster partition, some 50mm wide, which may have demarcated a square space in the northwestern corner (approximately 1m^2). It is unclear what this space may have been used for without further investigation, however it is interesting to note that there was a similar demarcation of space in the overlying B.76 (see 2011 Archive Report). Unlike its later mudbrick counterpart in B.76, the partition was constructed of pise-like plaster (F.3463); the remaining dimensions of the partition as it was attached to the wall were *c.*50m high by *c.*52m wide and up to 0.3m at its very thickest.

The remaining deposits excavated this season were all interpreted as part of the wider room-fill sequence of the overall space. Beginning with (19838), a thick band of dark-brown room fill including some charcoal flecking (some 150mm deep) covering a *c.*2.45m by *c.*1.60m area in the southwest corner of the space. This was overlain by (19830), which at up to *c.*0.22m thick was the first part of the abandonment sequence which effectively covered the whole space. This dense mixed silty-clay deposit yielded a variety of finds including obsidian and worked bone especially on or around the central platform, and interestingly red pigment patches (presumably from the degradation of paintwork which would have been on the walls of the space). In the northern part of the space, further concentrations of ochre[?] pigment were identified in compact clay-silt (19829), which was in turn sealed by a thin loose grey deposit with charcoal flecks (19831).

Above the main primary room fill deposit (19830), most of the remainder of the sequence that was excavated this season, focussed upon the deposits situated at the west of the room which remained *in situ* as the corresponding quadrants from last year's excavation strategy (see 2011 Archive Report). (19826) was a charcoal rich silty-clay in the southwest corner of the excavation

area with mudbrick and plaster fragments. This was sealed by (19824/19825), a *c.*0.25m thick band of room fill which corresponded with 2011's (19808). This was sealed by another clay silt fill, (19823), which was only found in the western part of the room. After this (19821/19822) corresponded with 2011's U.18793, and U.19817/U.19816 corresponded with 2011's (18790). Numbers were allocated to a small ephemeral cut (19820), and its fill (19819), in the northwestern corner of the room, which separated these last two deposits. This short sequence effectively marks the latest units to have been removed this season.

Building 96

Introduction

Figure 3.13. Post-excavation photograph of Building 96 (photograph by WS).

Work began upon the excavation of B.96 (Figure 3.13) in the 2010 field season, when the the buildings infill was removed under the supervision of Lisa Yeomans to reveal an irregular shaped structure divided into a main southern space (Sp.370) and a small northern storage space which showed clear signs of localised burning (Sp.444). This year work began upon the occupation sequence, concentrating for the most part upon floors and buildings in Sp.370 to the south. It is worth noting that the decision was made to section this building prior to excavating the occupation sequence associated with it. The nature of the limit of excavation at the southern end of the structure meant that a new stepped limit of excavation needed to be established at some point soon anyway and so upon consideration it seemed appropriate to do this prior to any engagement with this clear later phase of occupation. Furthermore the limit of excavation / section was adjusted in orientation so that it aligned with the overall orientation of the structure, thus no deposits seen in section would be oblique to the structure itself.

Space 370

The earliest features identified and excavated in this space were the latest burial events in the platforms along the eastern side of the space. Two were excavated in total, one in the northern platform (F.7002) and one in the middle platform (F.7001). Further information on the individuals laid to rest in these burials can be obtained from the Human Remains report in this volume, however a short summary will be provided here.

The northern burial (F.7002) (Figure 3.14 and Figure 8.11) was a very tightly flexed juvenile (19727), which was covered by a very clear layer of phytoliths, which was evidence of a mat or basket associated with the burial. The infill of the burial (19724) was an extremely dense and compact mid grey-brown sandy silt, which was sealed by a which marl plaster capping (19723),

Figure 3.14. : Basket burial (F.7002) located in northern platform of Building 96, Space 370 (photograph by WS).

that may have been an attempt to blend the cut into the platform floor surface through which it was cut. The cut itself (17928) was orientated broadly east-west and was *c.*0.65m long by *c.*0.46m wide, and *c.*0.31m deep. The burial was finally sealed stratigraphically by a discrete layer of thick, compact mid-grey brown make-up material (17919), which strongly resembled the burial fill itself.

To the south on the middle platform another burial was revealed and excavated (F.7001). This burial lay in another ovoid cut, *c.*0.64m long by *c.*0.41m wide (and *c.*0.41m deep), but was found to be incomplete, the skeleton (19820) was missing the lower part of its body including the legs. There was some evidence to suggest that this burial was the highest in a sequence of burials (There were signs of an earlier cut and human remains were visible in the section).

In the southernmost platform accessible to the north of the section through the building was evidence of another possible burial, however the cut (19716) and fill (18715) were not fully exposed and were only partially excavated on their northern side.

In the lower western part of the space the earliest excavated deposit was a grey silty-clay make-up layer (19722), upon which was laid a formal white marl floor (19714), servicing the central area of the room. It can be reasonably asserted that this floor is the one that is broadly contemporaneous with the burials. The order of deposition of the burials is harder to ascertain, since they were not intercutting or directly linked by platform surfaces (although the plaster capping on the northernmost – F.7002 – might suggest that it was slightly earlier than that on the middle platform).

Whilst the central floor remained place in the western half of the room, sloping very gently from *c.*1006.38m*ASL* in the north to *c.*1006.23m*ASL* in the south, along its eastern edge it was just stratigraphically sealed by a later surface upon the two northernmost platforms. This compact white marl surface (19713) also sealed the final burial sequence in these platforms and its laying might be seen as one of the last occupation activities in the northern part of the structure. Alongside the removal of this floor attempts were made to excavate the exactly contiguous wall plaster that was associated with the platform surface ([19725] on the east wall & [19705] on the north wall).

Sealing the platform surface along its western edge and across in the whole western part of the room was another final white marl plaster surface (19712), at an approximate height of 1006.48m*ASL*. This surface was noted as being compound, in that the grey makeup material was excavated at the same time as the surface. This was due to the fact that both deposits were extremely thin (*c.*2mm), and patchy in places. All of the marl surfaces which formed this sequence were completely sterile upon excavation, yielding no artefacts or obvious inclusions.

The last features that were excavated as part of this year's field season, effectively mark the end of the occupation phase of the building and the transition into the abandonment sequence. These include a number of post retrieval pits against the all the walls of Sp.370, (F.3500, & F.3506 against the northern wall situated upon either side of the entrance to Sp.444 in the north, F.3510 against the eastern wall between the central and northernmost platform, and F.7000 a large pit against the centre of the western wall) (see Figure 3.13 above).

Figure 3.16. Detail of phytoliths possibly associated with lintel, found upon removal of upper part of crawl-hole structure in north wall (F.3505) of Space 370 (photograph by AC).

Figure 3.15. Bone cluster found in post-retrieval pit fill (U.19700) against western wall of Space 370

The two northern pits (F.3500 & F.3506) were very irregular in their shape and their situation would suggest that they were meant to function with the northern door, although it is unclear whether they would have been structural or decorative, either way the presence of a wooden frame was attested to by the partial excavation of this northern wall (F.3505) for health and safety purposes, which revealed the a phytolith layer inside the wall and on the underside of the doors ceiling (see Figure 3.15), suggesting the presence of a wooden lintel in antiquity. The cuts themselves ([19709] east, & [19711] west) were basically ovoid in shape, albeit a little irregular in places, averaging between 0.40-0.80m long, 0.30-0.5m wide and 0.25-0.35m deep orientated east-west along the northern wall. Both cuts were filled with dense and compact orange brown silty-clay, which included fragments of plaster, presumably from the localised disruption to the floor sequence when the posts were retrieved. The eastern pit (F3510) was very similar to those in the north, the cut (19231) was *c.*0.79m long (east-west) and *c.*0.65m wide (north-south), by *c.*0.43m deep. All of these pits were notably sterile in terms of the artefacts they yielded.

By contrast the western pit (F.7000) was significantly different in that it was larger up to *c.*1.25m long (north-south) by *c.*0.80m wide (east-west), by *c.*0.42m deep. The fill itself (19700) was not unlike the other pits in that it was a dense and very compact clay-silt, although it was a little more heterogeneous containing some more ashy lenses and significantly a cluster of mixed animal bone (19702) described as containing (see Figure 3.16):

"tibia (sheep or goat), femur (sheep or goat), thoracic vertebra, lumbar vertebra, mandible (sheep or goat), scapula (cattle), rib, pelvis (cattle). The lower layer of this cluster contains horn cores (cattle) and a lot of friable and hard to define bones" – Extract from 2012 database entry WS.

This suggested that the nature of the pit was quite different from its counterparts elsewhere within the space, and it remains possible that this may have been related to a slightly different function such as the retrieval of a piece of artwork mounted upon the west wall.

Building 97

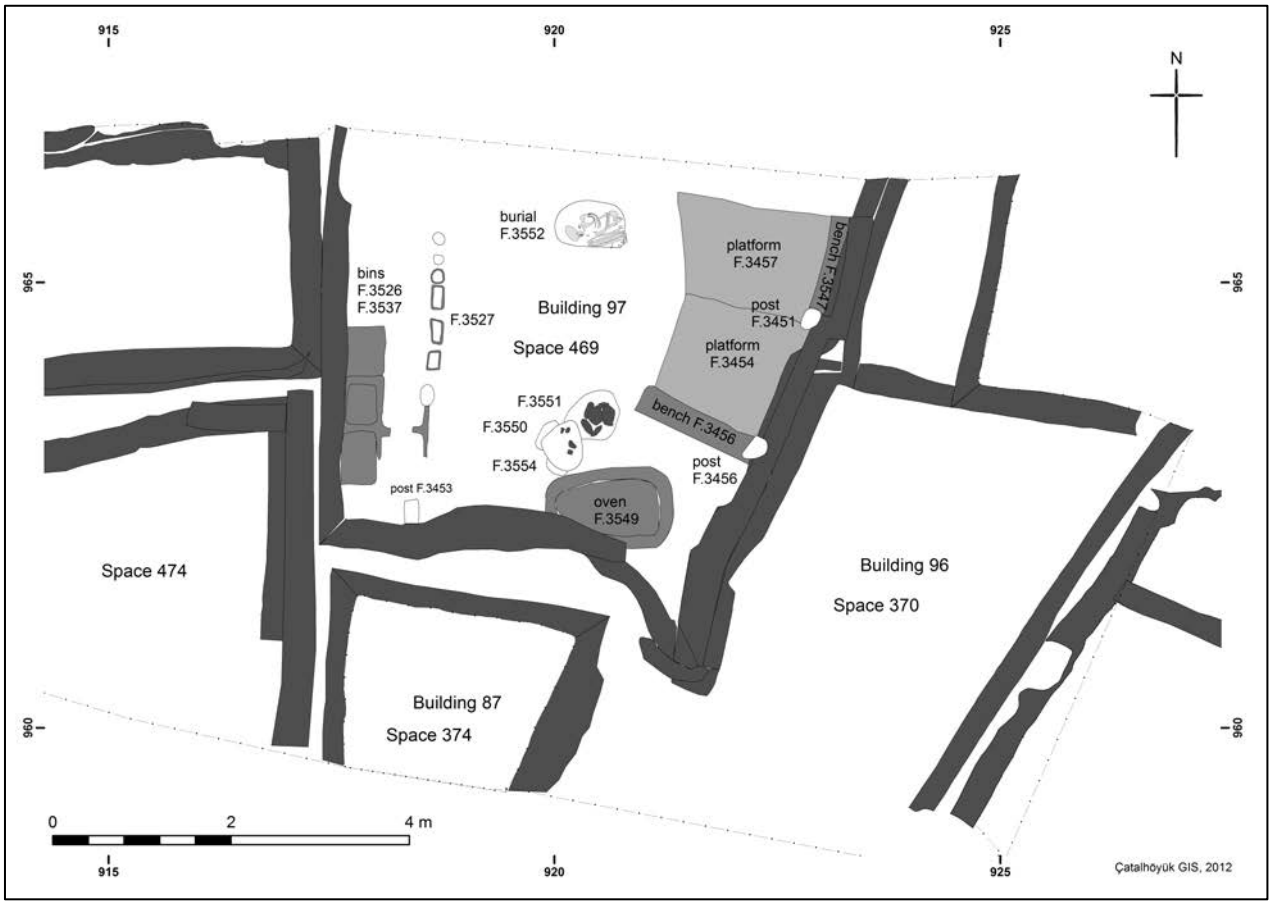

Figure 3.17. General plan of Building 97 (illustration by Camilla Mazzucato),

Introduction

Building 97 (Figure 3.17 and 3.18) has been exposed in plan Mellaart's 1960's campaign, and recent excavations of the structure begun in 2010 by Lisa Yeomans, revealed that the building was also uppermost layers of infill were excavated by James Mellaart, although he did leave some areas completely untouched, especially in the southeast corner of the structure. This year work continued from Yeomans' 2011 intervention, in an effort to excavated the building in its entirety in order to understand the broader relationship with the structures below it. In particular Space 160, associated with Mellaart's House 11, which serves as a critical link in the overall stratigraphy of the South Area, and as such forms one of the excavation priorities linked to the ongoing C14 dating project (see Bayliss and Farid, this volume).

Figure 3.18. North facing general shot of Building 97 (photograph by Jason Quinlan).

Figure 3.19. Detail of southern wall of Building 97, Space 365 after its partial removal (photograph by OY).

Figure 3.20. Detail of post-holes comprising partition wall (F.3527) in Building 97 (photograph by OY).

Space 365

Space 365 was the main living space of the building, forming a rectangle *c.*5.30m (east-west) by *c.*3.82m (north-south). The southern wall of the building was partially removed this season to make it safe for working beneath (Figure 19). But the earliest stratigraphic unit to be removed this season was an underlying make-up deposit (20362), which was not fully excavated by the end of season. This was thought to be a room-fill / makeup deposit of an earlier structure, which may respect the external limits of the structure. It was unclear by the end of the season whether this constituted a simple change of use of one structure or a complete internal remodelling.

Typically the later space was characterised by platforms on the eastern and northern side and dirty floors to the south. Above the make-up deposit (20362), the next key feature stratigraphically was the various post-hole cuts which made up the the north-south orientated partition wall (F.3527) with the narrow storage Space 469 to the west of the building (see below).

This wall essentially comprised eight ovoid postholes arranged in a north-south line (Figure 3.20), ranging from 0.15m-0.34m long (averaging *c.*0.27m), and between 0.10m-0.31m wide (averaging *c.*0.18m). The depth of the posts was very consistent ranging from 0.14m-0.18, each

had a flattened base, but more interestingly they all (except one) contained burnt timber remains of the posts themselves; suggesting that the partition suffered fire damage at the end of its use-life (curiously though, apart from some of the post retrieval scars, there was little or no evidence of burning elsewhere in the structure, suggesting either that the fire damage was minor and localised, or carefully controlled).

Within the linear arrangement each individual posthole was also orientated north-south, suggesting that the partition was made of box halved timbers, giving the wall a more regular, even and flattened face. Certainly this fits with the observation that all of the later surfaces and make-up layers within both spaces appeared to lip up against the edge of the postholes, hinting at the fact that the structure itself may have been plastered (reiterated by a distinct linear break in the various deposits that respect the postholes in the gaps between them as well – suggesting that the physical barrier wasn't just the posts themselves). The post at the southern end of this arrangement appeared to function with a post scar and post retrieval pit (unit [18691], F.3453) on the north face of the southern wall of the building, apparently forming an opening between the two spaces.

Another small posthole was identified at this stage (F.3556) against the eastern wall, *c.*0.22m in diameter and *c.*0.16m deep, with a further *c.*0.73m of fill attached to the wall filling an obvious post scar. This post hole was significant because it formed the earliest component of a bench (F.3456), with a fairly long lifespan extending from the same wall and marking the southernmost of the platform and bench features defining this side of the space.

Figure 3.21. Detail of hearth structure F.3549 in Space 365 (photograph by KJ)

In the southern part of the space the first of several pyrotechnic features, an ovoid raised hearth (F.3549) (Figure 3.21), began to define what would become the typical 'dirty area' seen in most buildings, characterised by the oven/hearth sequence and 'dirty' floors. The hearth was *c.*1.45m long by *c.*0.9m wide with a raised but flattened mould pise-like rime ranging between 40-80mm high. The hearth was typically filled with a grey/black mottled ash-rich silt with charcoal that yielded not significant finds (19699). Lipping up against the hearth was the first of the 'dirty floors' that marked the earliest occupation of this probable phase (20342). The surface itself was characteristically composed of a soft grey clay-silt, and contained charcoal, ground-stone and clay ball fragments. At an elevation of approximately 1006.36m*ASL* the unit dominated the southern third of the space.

To the north of the space, under what would become the northern central platform, in a cut (20349) *c.*0.70m by *c.*0.50m wide was a skeleton (20351), which appeared to be part of the burial sequence begun in 2011 (excavated up to and including F.3540). This burial (F.3552) was filled with a very compact homogenous clay rich silt fill (20350) which strongly resembled the make-up material through which it was cut. This combined with possible trunctation by the later

burials in the sequence made the edges of the cut imperceptible, and moreover left us unsure where exactly the skeleton might be placed exactly in the stratigraphic sequence. In fact it may well post-date the construction of the later platform feature (and arguably probably does, although it remains a possibility that the body was laid down prior to the placement of the make-up material and was not strictly in a cut).

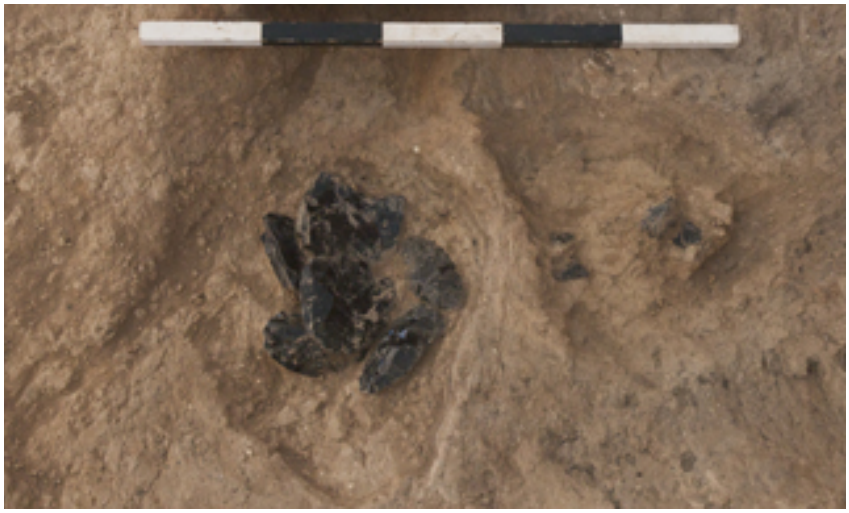

Figure 3.22. Detail of obsidian caches U.20334 and U.20337 (photograph by JLM).

In the southwest corner of the space another skeleton was found to protrude from under the wall (20367, sealed by 20368), but the exact stratigraphic relationship here remains a little ambiguous as the Skeleton remains *in situ* at the time of writing and it is not clear how it relates to the wall at this level. Perhaps more immediately interesting were the three obsidian caches (20334, 20337 & 20369) found to lay in small circular cuts or scoops through this floor deposit (Figures 3.22), *c.*0.3m in diameter and up to 0.16m deep ([20333], [20336] & [20370] respectively). The first cache (20334) contained: "2 s[e]mi worked obsidian tool, 4 obsidian pieces, 1 figurine and 1 worked stone [artefact]" (Extract from 2012 database entry OY). The second (20337) was comprised of eight large pre-form bifacial obsidian tools, whilst the last (20369) included another thirteen obsidian pieces (see also Chipped Stone Report, this volume). The burying of these caches in this apparently early occupation layer (of this later phase of the structure) is consistent with patterns deposition seen elsewhere.

These caches appear to have been immediately sealed by another broad make-up layer (20341) which more or less covered the whole space up to 50mm thick, respecting the partition on the western side. The deposit was thicker on the eastern side under the later bench and platform features (see below), and was a greyish brown clay-silt with charcoal, plaster, bone and obsidian fragments. To the south of the space a second thin make-up layer (20331) forming a band about 1.5m wide along the southern part of the room (ranging from 10-70mm deep), appeared to prepare the area for the later features in the 'dirty area' of the space. This makeup deposit was considered compound and included remnant plaster patches, suggesting a significantly higher degree of wear and tear in this part of the room.

Figure 3.23. Detail of hearth (F.3541) and associated firespot (F.3545) in the southern 'dirty' half of Space 365 (photograph by JLM).

Immediately sealing this make-up in the south of the room was a 'dirty floor' (20331) associated with another phase of the hearth structure (F.3541) (Figure 3.23),

which this time took on a more circular shape (approximately 1.00m diameter and 110mm high). This was seen to comprise and upper and lower part ([19697] & [19695] respectively). Whilst the lower component formed the bulk of the pise-like rounded and moulded rim of the hearth, the upper component may simply have been the same structure element subject to heat damage. I was essentially a compact, discoloured, 'baked surface' with some pieces of obsidian and shell pressed into the base. It is likely that the hearth (F.3541) was related in function to an adjacent fire-spot (F.3545), set in a 100mm deep (approximately 0.45m wide) scoop just north of the hearth (20304).This fire-spot appeared to have two distinct phases of use, marked by a remodelling event, whereby a clay lining (20302) was added, sealing a small amount of the original charcoal rich fill of the cut (20303). In the southeastern corner of the space, a further make-up deposit or remnant floor surface was identified against the wall in the corner (20326).

A number of features were identified in the northern part of the space, roughly contiguous with the first make-up layer and 'dirty floor' in the south ([20331] & [20325] – see above). Including in the northwestern corner of the central floor space another burial (F.3548) of a 6-8 year old child, which formed the earliest part of a sequence excavated in 2011 (one of which truncated this individual removing the left foot. This was in turn sealed by a broad make-up deposit for the central floor sequence (20327), which at up to 100mm thick in places, formed a substantial foundation for a couple of plaster floor surfaces, (20234) in the southwest, and the more substantial (20316), which was best preserved along the northern limits of the space. For the most part these central floors and make up pre-date the later platforms along the northern edge, suggesting the central space was more substantial in the earlier phases of the structure. These floors were sealed by yet another greyish-brown clay silt make-up deposit (20307) for the later floors excavated in 2011 (at a height of between 1006.37 and 1006.55m*ASL*).

Figure 3.24. Platforms and benches against the eastern wall of Space 365, Building 97 (photograph by KJ & OY).

The eastern side of Sp.365 was characterised by a more complex stratigraphic sequence (Figure 3.24), related to the construction and use of the eastern platforms: the east-central platform (F.3454), *c.*1.16m north-south by *c.*1.82m east-west, and the northeast platform (F.3457), *c.*1.28m north-south by *c.*1.30m east-west, and the formers associated bench structure (F.3547), *c.*1.43m east-west (long) by *c.*0.30m north-south (wide). The northeast platform was also associated with the later north central platform (F3455) excavated in 2010. Underlying the east-central platform was an ephemeral plaster floor surface (20306), at approximately 1006.50m*ASL* elevation, which may be associated with an earlier incarnation of the structure, but this remains unclear. This was sealed by two discrete 'make-up' events that form the core of the structures. To the south was (20321), which was the inner core of the bench (F.3547) incorporating, aligned with and protruding east-west from the adjacent post scar (unnumbered at time of writing). Immediately north of this was (20319), which formed the first core of both the east-central and north-eastern platform, which were at this stage in their construction indistinguishable. These structural deposits were very typical, sterile, compact

greyish brown clay-silts, which were clearly easy to manipulate and mould and when dry formed a very stable and compact foundation for the room furniture. The overlaying compound make-up / plaster surface (20315), up to 4mm thick in total, was concentrated upon the southern of the two platforms (F.3454), but also overlapped the northeast platform to a lesser degree.

From this point on is not clear which platform developed first, as the remaining sequence for each had no direct stratigraphic relationships. All of the deposits detailed below in these platforms were distinctly sparse in their yield of finds. On the northern platform, another makeup layer was laid on top of the structure (20313), up to 40mm thick serving as levelling for the overlying plaster surface ([20312] & [19698]) which was only up to 5mm thick at an elevation sloping from 1006.59m*ASL* to 1006.38m*ASL*. This was sealed by another make-up / levelling layer up to 60mm thick, which in turn formed the foundation for another white marl plaster surface (19692), at an elevation between 1006.54m*ASL* and 1006.62m*ASL*.

The east-central platform developed in a similar way, with consecutive construction events comprising make-up / levelling deposits sometimes so thin that they had to be removed as compound layers (on the assumption that the – albeit very thin make-up – served as preparation for the immediately overlying plaster. (20317), like (20315) (discussed above), fell into this category with silt make-up and plaster surface being 4mm thick (max). Initially an anomaly in the centre of this plaster surface (and therefore the centre of this specific platform) appeared to indicate the presence of a burial. However, investigation of the cut (20310), filled by (20308), was abandoned when the edges became too hard to follow and no human remains became evident at a depth about 100mm. This anomaly was sealed at approximately 1006.50m*ASL* by another plaster surface (up to 20mm thick). This robust surface marked the deposit where the 2011 excavation ceased, and work continued this season; thus detailing all the deposits in Sp.365 excavated this season.

Space 469

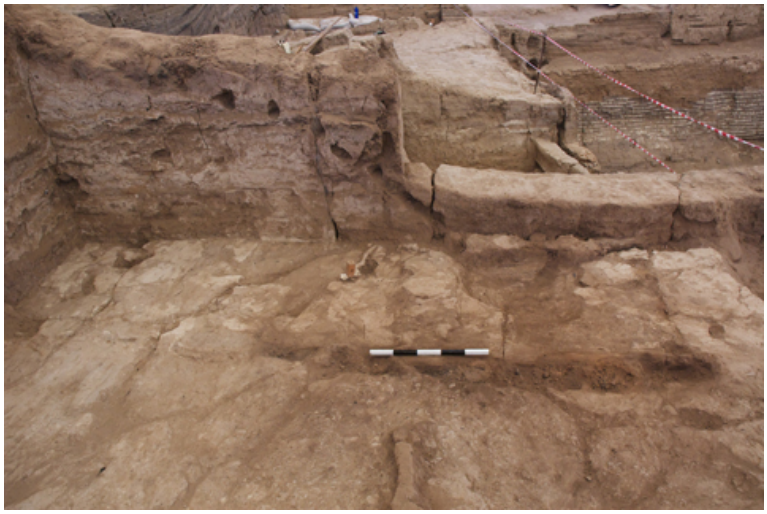

Figure 3.25. West facing general shot of Space 469 (photograph by OY).

To the west of B.97, beyond the partition wall (F.3527), was another discrete possible storage space (Sp.469). This space ran the length of the building north-south some 4.63m (Figure 3.25), and was *c.*0.94m wide, and was characterised by a different set of features and surfaces than in the eastern Sp.365. Here the earliest identifiable surface ([20347] – *c.*10mm thick at an elevation of 1006.40m*ASL*), and the pise-like bin base ([20352] – including scars for the removed sides) characterised the space as a storage area. Both the floor and the bin base, were made of a very similar homogenous light grey clay silt material. The bin itself, approximately 0.50m by 0.40m, was perhaps more 'smooth' as a surface and the floor had some evidence of burning (possibly related to the destruction of the partition wall), both however were practically devoid of finds and inclusions.

The sequence in the room continued in the northern stretch of the room with a broad make up deposit up to 80mm thick (spanning the space and running approximately 3.90m north-south). For the most part this deposit was a fine dark-grey silt (orange where it too had been heat affected), and it marked the foundation surface for three discrete grey/white plaster surfaces ([20343], [20344} & [20345] – the latter also being heavily burnt). These surfaces were very thin, perhaps 10mm, and contained few finds and obvious inclusions (very occasional animal bone, seed and shell) and all respected the partition wall at an elevation of approximately 1006.39m*ASL*.

Figure 3.26. :Detail of bins (U.19694) in Space 469 (photograph by MB).

The central portion of the space was then sealed by a compound greybrown make-up and white plaster layer (20300), approximately 1.53m north-south by *c.*0.86m wide and 20mm deep in total. The make-up component of this deposit may have been associated with the construction of three more bins which appeared to have been moulded at the same time out of the same sterile 'pise-like' grey-brown clay silt (19396) (Figure 3.26). The bins, averaging approximately 0.50m by 0.40m across, were all coated in a thin plaster surface (U.19694), before being in-filled with fairly sterile grey-brown silt (19691) and (20305), with very occasional animal bone and plaster fleck inclusions.

At the very northern end of the space another separate sequence of make-up and levelling deposits / possible surfaces appears to have been deposited aside from the bins in the centre of the space. The first of these stratigraphically (20318) was a partly burnt make-up layer, comprised of orangey-brown silty-clay, forming an irregular patch up to 1.08m north-south by up to 1.11m east-west, approximately 10mm deep at an elevation of *c.*1006.37m*ASL*. This sealed the earliest of the previously discussed floors (20343 – see above), which was also cut off from its southern counterparts at this point by a substantial sub-circular cut across the space, approximately 0.60m diameter, up to 0.12m deep ([20322] – filled by [20320]). The sequence then continued to the north of the 'pit' with three further burnt 'make-up' deposits (20314), (20309) and (20311), all much the same in composition to (20318) (described above) which they sealed.

These deposits mark the latest contexts available for excavation this season in Sp.469, and therefore the beginning of the seasons work. All deposits in both spaces that were sealing this point were excavated as part of the 2011 field season.

Concluding Notes

Building 97 remains incompletely excavated and the critical stratigraphic relationship between the building and the underlying Sp.160 required for the on-going dating project remains incompletely understood, especially given the fact that the earliest deposit in the structure appear to be represent a complex and different use and configuration of the space within the walls of B.97.

Building 7 and Associated Spaces The "Shrine 8 Annex Sequence"

Introduction

The excavation of this sequence of spaces was a direct continuation of work begun in the 2010 field season by Roddy Regan. The overriding motive for continuing intervention here this season was to explore the stratigraphic relationship between the "Shrine 8" sequence excavated in the 1960's by James Mellaart, and the southern sequence excavated in recent years by the current team. The purpose of this exercise was to try and join up the two excavations stratigraphically. This level of stratigraphic control is a prerequisite for the ongoing Baysian C14 dating project (see Bayliss and Farid, this volume). Examination of the north facing section adjacent to this space has led to speculation that the sequence of spaces including and beneath Sp.470 would have serve as annexes or southern storage rooms to corresponding Shrines in the B.7 ("Shrine 8") sequence. This tentative connection is based upon the observation of a couple of possible crawlholes which may have connected the structure around Mellaarts Level 8 (Hodders Level 6-8 or 9 – the exact level remains a little unclear at the time of writing and needs consideration alongside Mellaarts original observations), and this is what was aimed to be tested in the 2012 field season. Specifically it was important to ascertain whether the space designated Sp.470 was actually an annex to Mellaart's Shrine 8 (henceforth referred to as B.7 in our numbering system), or whether it had no relationship to Mellaart's shrine sequence.

Space 492

Sp.492 was the earliest space number designated this season, and was defined by walls on all four sides (east: F.7061, south: F.7060, west: F.7062 and north: F.445) making a rectangular space orientated broadly east-west, approximately 3.80m long by 2.35m wide. All of these walls, where exposed, had a thin remnant layer of patchy plaster, across their surface, which ran behind/below and internal deposits within the space. Although the latest phase of occupation activity, associated surfaces and furniture was reached during the excavation of this room, only half of this area was actually revealed. Time constraints and the prioritising of the need to ascertain the relationships between the various structural elements of this space, outweighed the need for full analysis of its function, culminating in the decision being taken to half-section the space. It is worth noting (as mentioned already) that this space was believed to be connected to the equivalent B.7 structure to the immediate north via a crawl-hole *c.*0.82m wide (see discussion of niche in Sp.470 below). This entrance was never revealed as an actual excavated crawl-hole because the walls defining the later Sp.470 were not removed in the course of this season's excavation.

As such it was the eastern half which was revealed, where sitting upon a dark brown fine silty surface was the lowest course of an substantial elongated, flattened ovoid oven structure (F.7063), *c.*0.67m wide and projecting 1.12m from the southern half of the eastern wall clearly dominating the southwestern corner of the room. Both the floor (20543) and the oven were unexcavated at the end of the excavation season and are currently not fully understood (indeed the latter remains unnumbered at the time of writing).

Despite a step of some 0.59m, excavators believed that the floor surface (20543) functioned (at a height of *c.*1004.18m*ASL*) with a cut in the northern wall (basal elevation *c.*1004.77m*ASL*), which probably acted as a crawl-hole between Sp.492 to the south and Shrine 8 (arguably Mellaart's Level IX?) to the north. This is a critical link in overall stratigraphic sequence in the South Shelter as it effectively joins a significant amount of Mellaart's stratigraphy with that of the current excavation to the south. However the current exposure of Sp.492 and the complete

excavation of the Shrine 8 sequence by James Mellaart in the 1960's seasons, means that very little can be said at this juncture about the relationship between these two spaces and the possible function of the southern room.

Returning to the southern Sp.492, strewn across both the floor and the oven (clearly after the latter's disuse and possible deconstruction, since it would appear to also seal the darkened ashy fills of the oven), was a significant mixed cluster of artefacts and ecofacts – stone, bone and clay balls – (20542) which would appear to represent a placed abandonment deposit. This cluster consisted of: "10 partially - and 4 whole preserved clay balls; number of animal bones including at least three articulated ones […], one animal skull […]; dozens of pebbles and 6 ground stones" (Extract from 2012 Database entry LS/GE).

There was no obvious patterning in the distribution of these objects and they were immediately sealed by a couple of dense packing and room-fill deposit (20206) & (20524). Although divided numerically, these mid yellow-brown clay rich silt deposits, contained some clear brick, plaster and occasional charcoal fragments, and the unit division may well be arbitrary, possibly representing colour gradation (darker, more orange at the bottom to lighter more yellow higher up) in a continuous process of dumping and levelling some 0.48m deep. These deposits mark the final disuse of Sp.492, but crucially would appear to act as a very dense and compact foundation deposit for the architecture and floors of the overlying Sp.470, and in this sense they resembled room-fills seen elsewhere upon the site.

Space 470

Sp.470 immediately sealed the underlying Sp.492, with its architecture resting directly upon the walls of that space upon three sides (east: wall F.7057, west: wall F.7056, and south: wall F.7055). However the overall width of the space was foreshortened by approximately 0.40m, because northern wall of the space (F.7052) was set upon a thin (*c*.50mm) bedding layer (20521), along the southern side of the earlier northern wall of Sp.492 (F.445) and was thus founded directly upon the latest room-fill/packing deposit of that space (20524). The rationale behind the change in placement of this northern wall was not entirely clear (partly because the structure is not fully excavated at the time of writing), however it is possible that with the change of structure the relationship and relative function of Building 7 ("Shrine 8") and its southern "annex" also changed and required a change of access. Any access between the later Sp.470 and a related northern room has long since been excavated (by Mellaart in the 1960's) and/or subsequently eroded to be ascertained at this point in time. However, there is no evidence of another entrance into Sp.470 in any of the other walls and so it can be reasonably assumed that the space still functioned with whatever was situated to the north in antiquity.

Whatever the case, the net result of adding the wall in this way (apart from making Sp.470 narrower than its predecessor), was to effectively block the crawl-hole identified in Sp.492, transforming it into a niche at this level (some 0.82m wide by 0.22m deep, and surviving to an eroded height of *c.*0.57m). Curiously in the first instance it was clearly meant to function as a niche, since the inside (both at the back against the north side of wall F.7052, and the truncatated ends of the earlier wall F.445) was rendered with a soft silty sand render, before being finished with a now thin, patchy and eroded silty marl plaster. The base of this niche was at 1004.77m*ASL* which was at the same working height as the primary plastered surface in this new southern space, tantalisingly suggesting that building was developed variously at different times (the newly formed niche probably functioned with the original floor surface in the main northern Shrine 8 (B.7) space – there is no evidence to suggest otherwise, including no access

visible below this height in the earlier northern wall F.445). So the occupants of this house would have moved from stepping through a raised crawl-hole some 0.60m off the floor into Sp.492, to stepping up into a much higher southern room (Sp.470) after the floor had been raised and the original crawl-hole blocked. The accumulated infill between these two walls (20212), a mixed orange brown material, was partially excavated to establish the relationships outlined above, it contained charcoal flecks and bone fragments but was otherwise not unusual. It was not clear whether it was explicitly cut by the early crawl-hole (although this seems unlikely), but it was sealed by the later render/plastering events suggesting that it was in situ by the time the crawl-hole was adapted into a niche.

Inside Sp.470 the layout seemed different and simpler than its predecessor. There was no oven, simply a short length of brick partition (two bricks long, approximately 0.70m long by 0.25m wide, and one brick high, *c*.70mm high), not yet excavated (and not numbered at the time of writing). At this point the process of packing appeared to continue, presumably to make up the ground a further 0.40m (20545) in preparation for use of the room. Below any subsequent floors, in the southwestern corner of the space was a small pit (20538) of unclear function; the fill (20539), which was a homogenised clay silt closely resembling the room-fill that it cut, simply yielding some clay balls.

Figure 3.27. Phytolith rich plaster floor (U.19397 & U.19394) and associated cluster (U.19392) in Space 470 (photograph by Jason Quinlan).

At this point the pit and any previously lain make-up material was sealed by a thin white marl plaster floor (19397), which upon inspection was found to correlate with the very thin and badly eroded plasters found upon the walls of the space ([20209], [20531], [20534] & [20537]), which typically resemble those found in storage areas elsewhere on the site (Figure 3.27). Apart from this surface, all of the occupation in Sp.470 was relatively informal, immediately sealing the plaster surface was a thick spread of phytoliths (19393). Consultation with the Phytolith Specialist (see Ryan this volume) led to the following assessment:

> *"According to specialist analysis the evidence of the phytoliths (mainly impressions of husks) brings to light particular activities that took place in the space 470. It is highly possible that its last phase of use was involved with de-husking of crops. The analysis highlighted also that the phytoliths mainly consist of the remnants of wheat and some wild grasses. Consequently, the described deposit indicates a special kind of processing area." – Extract from 2012 database entry AK.*

Two more small pits of unknown function were identified in the space (F.7051 & F.7054) in the centre of the space, cut at various points during the main occupation sequence. This sequence consisted primarily of a laminated beaten earth surface (19394) which had a characteristically 'greasy' feel to the excavators touch (clay-rich?). Crucially all of this activity appeared in plan to

be concentrated in the western half of the space (although it is worth noting that only this half of the sequence was fully excavated, indeed this occupation sequence marked the point at which the room was sectioned by the excavators).

Sat upon the beaten surface (19394) was a mixed cluster of artefacts (19392), comprising: "1 half- and 9 whole preserved clay balls; 1 horn core; 1 antler; 4 ground stones" (Extract from 2012 database entry AK). This cluster was distributed evenly across the space, and appeared once again to mark the disuse of the space since it was immediately sealed by dense deposits that were interpreted as primary room fill ([19391], [19390] & [19389]). Perhaps uncharacteristically this sequence of room was particularly rich in x-finds, especially but not exclusively including ground stone, worked bone and figurine fragments.

In total the various room fills which largely comprised of mid yellow brown dense clay-silt, totalled a depth of 1.27 m, which is more in keeping with the sort of depth expected in house closures seen elsewhere upon the site, although there is little that can be said about the nature of this closure event (apart from the abundance of artefacts lower down in the sequence, because the uppermost of these deposits were very heavily truncated by Mellaart's 1960's excavation. Indeed, the highest deposit in the sequence (19389) was only really to be found banked up against the west wall and adhering to the eastern wall where the room had not been cleaned properly by Mellaart.

At some point during the lifespan of this room the niche (F.456) was also fully decommissioned. A dense packing layer was laid down (20517), in the base and up the back of the nich, consisting predominantly of brick-crush, before the niche was formally blocked with bricks (20215) and mortar (20216) to make it flush with the surrounding B.7 walls. How this process actually worked is difficult to ascertain without detailed consideration of Mellaarts findings in the main part of B.7 to the north, but this blocking event would seem to indicate that the niche was modified during the lifespan of the structure and may correspond with some remodelling within the northern room.

Space 487

Space 487 was very poorly preserved, primarily because it was subject to excavation by Mellaart in his 1960's campaign of excavation, and subsequently it had clearly been left exposed and eroded. In fact despite its poor state of preservation there was some information noted about this structure during the course of excavation of its remnants.

For the most part all that really remained of this space was the walls, although some heavily truncated internal deposits were identified along the eastern wall, and in the south western corner of the space. The walls themselves once again respected those upon which they were directly founded (which defined the underlying Sp.470 – see discussion above), with F.3700 to the east, F.4095 to the west, F.3701 to the south and F.7050 defining the northernmost limit of the space. Curiously the northern wall appeared to have the same double wall configuration as the lower B.7 (the northern wall being F.7053, and both being sealed by a silty-sand between-wall fill – [20205]). However it was not at all clear how the dynamics of Sp.487 and its northern counterpart would have functioned as a building since only a much eroded *c.*1.75m length of these walls survived on the western side of the structure. There was almost nothing left of the floors, and no surviving evidence of access or internal furnishings in relation to the space.

With regard to the former a sequence of floor was removed in the 2011 season (19368), which still adhered to the south-western corner of the room. This year a similar corresponding sequence was removed, which had survived irregular truncation by Mellaart's excavation against the eastern wall (19388). Although the remains were ephemeral they did show evidence of one clear flooring event with possible repairs – although the floor was fairly light-weight and patchy and resembled those of the spaces below, suggesting a similar annex or storage room function.

Figure 3.28. Detail of 'between wall fill' deposit showing articulated metacarpals and metatarsals (19387) (photograph by AK).

For the most part this completes the sequence for the space, although it is worth noting that on the south side of the southern wall (F.4095) a midden-rich between-wall fill was excavated, which also contained a number of clay-rich lenses, and a variety of material culture including shell, obsidian, clay balls, pottery, charcoal flecks and animal bone (the latter included an articulated cluster of sheep meta-tarsals and meta-carpals with some evidence of butchery – [19387]) (Figure 3.28), leading to the interpretation that it may be associated with the abandonment and midden sequence of Sp.474, B.104 to the south, excavated in 2011. Indeed the infill may be a continuation of a higher between-wall fill (19359), since sealed a dense mid yellow-brown clay-rich underlying fill, which (although presently unexcavated and therefore unnumbered at the time of writing) may represent an deposit associated with the construction of these adjacent buildings.

Conclusions

This marks the end of the supposed "Annex" sequence. It is worth noting that although the season objectives were reached and that the annex was satisfactorily proven to be associated with the Mellaart's main Shrine 8 structure to the north, and a connection was made with the main stratigraphic sequence excavated to the south of the building in previous season, the actual site-wide levels to which these spaces belong is a little sketchy. It seems likely that the middle space in the sequence (Sp.470) is associated with Shrine 8 Level VIII (Mellaart's system), or Level South.L (Hodder's system). This would make the earlier Sp.492 Level IX (Level South.K), and the later Sp.487 Level VII (Level South.M). However in terms of level and adjacent structures Sp.487 would cursorily appear to be broadly contiguous with the adjacent B.97 structure, which is currently thought to span Level VIa/b (Levels South.N and South.O). Although this may be coincidental, or reflect nothing more than a temporal overlap, it is clear then that some investigation may still be necessary to fully understand the broader structural sequence here.

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4. The excavations of the TPC Area in the 2012 season

Arkadiusz Marciniak, Patrycja Filipowicz, Allison J. Mickel

The 2012 season brought about the beginning of the field work in the previously unexcavated area located in SW slope of the southern prominence of Çatalhöyük East. The trench was opened between two previously excavated and systematically studied areas, namely the South Area and TP Area (Fig. 1). This new excavation zone was named the TP Connection Area (TPC). The decision to open up the trench is this part of the mound was a direct consequence of the results of works in these two areas conducted over the last years. The ultimate goal of this project is to connect the stratigraphy in the TP Area, excavated in the years 2001-2008, with the main stratigraphic sequence in the South. The corresponding goal comprises recognition of architecture, burial practice, pottery and obsidian manufacture and use, subsistence, landscape use, etc. in the period between the end of the South sequence (Building 10 in South – T) and the beginning of the TP sequence (Building 81 in TP-M).

Works in the early levels of the settlement in the South Area revealed that the neighbourhood community was a major organizing principle of society. It was indicated by the salience of clustered houses and by the asymmetric distribution of sub-floor burials between them. Some houses in these early levels had a dominant position in terms of access to ancestors and religious paraphernalia and performance (compare Bar Yosef 1989; Cauvin 1994; Hauptmann 2002; Őzdoğan and Őzdoğan 1998; Schmidt 2001), but they did not convert this predominant position into the control of storage, resources, exchange or production. These houses were integrated into larger neighbourhood associations involving economic pooling. Interestingly, in the upper levels of South area, there was less direct continuity as houses were rebuilt, and the pace of rebuilding quickened. These shifts in site formation anticipated substantial changes revealed in the uppermost levels in the TP Area.

At the same time, recent excavations of the upper Late Neolithic strata (c. 6300 – 6000 cal BC), the bottom of which is more than three meters above the uppermost building in South Area, conducted by Team Poznań in the years 2001-2008, revealed considerable differences in material culture indicating significant social and economic transformations of the local community towards the end of the Neolithic (Marciniak, Czerniak 2007). A residential pattern emerged with less densely-packed clusters of households and increasing amounts of open space (Düring 2005; Düring & Marciniak 2006, Marciniak 2008), and an apparent decrease in the importance of building continuity (Düring 2001). They began to control storage and production. These new arrangements made possible to establish a system composed of individual farmsteads characterized by solid economic footing and related to other farmsteads by communal and ritual activities performed at the regional level. The overall context of the process, its mechanisms, pace, and consequences have not been investigated to date.

Accordingly, the primary objectives of works in the TPC Area comprise a study of the development of houses in the excavated sequence in order to capture the emergence of individual households as well as corresponding changes in the economic system. Through time, rather than participating in a communal and shared resource, as seems to have been the case in the lower levels of the East mound, the economy became more intensive, more integrated and more based on individual household production. Accordingly, it is required to investigate whether the processing of different products (e.g. plants, bones, meat or milk) became most effectively achieved in domestic space that was also more controlled and private. The

specialization in different domestic activities and decreased significance of sharing will also be studied.

The excavation season 2012 in the TPC Area began on June 28th and continued until August 2nd. The goal of this year works, carried out in selected parts of the TPC Area, was to recognize and lift post-Neolithic structures, identify Neolithic constructions and strata placed directly underneath and start excavating them. In overall, we managed to excavate a number of late burials (probably early Islamic in date), Hellenistic structures as well as individual elements of the Neolithic and probably Chalcolithic occupation.

The works in this season began by removing fill left by Mellaart in the south most trench in the area excavated by his team in 1961 and exposing Buildings 4 and 5, dated to Level III (Mellaart 1962, Fig. 3). These works were carried out in two new trenches - Trench 1 and Trench 2. Trench 1 is 5 x 5 m and is located directly to the south of the Mellaart Area. Trench 2 was opened up directly south of Trench 1. Its overall dimension is 5 x 6 m.

The work in TPC Area in the 2012 season involved also excavation of the area adjacent to the south-eastern corner of the big shelter above the South Area. This area shall enable to directly link the two stratigraphic strands, as defined above. The works in the area were preceded by the GPR survey (see Campana this volume). Consequently, a Trench 3 was set up adjacent to the south-east corner of the shelter and parallel to its eastern wall. The overall dimension of the trench is 10 x 10 x 6 x 8 m. The works in Trench 3 began on July 16 and were carried out until the end of the season. The ultimate goal of this season in this area was to excavate all post-Neolithic features and layers and get to the Neolithic strata.

Relations of the TPC Area to adjacent excavation areas

The TPC Area vs. TP Area & Mellaart's trenches

As mentioned above, the TPC Area is located between the TP Area and Mellaart Area A to the east and north and South Area to the west and south. The aim of the excavation in the TP Area was the investigation of the lastest phase of the East Mound occupation. TP Area is located immediately to the east of where Mellaart had excavated Levels I-IV. The area proved to be heavily utilised in the post-Neolithic period, which sealed the latest Neolithic levels identified as Levels 0 – II. Originally, a trench 10 x 10 m to the east of Mellaart's Area A, close to the top of the mound was opened (Czerniak *et al.* 2001). It was later extended 10 m to the west, including fragments of the area excavated by Mellaart in the 1960s (Mellaart 1962, 1963, 1964). During eight years of excavations over 2000 units have been recorded. They were assigned to particular buildings and spaces and those were in turn allocated to the phases of the mound occupation from the Neolithic to the early Islamic period. Mellaart defined fifteen separate superimposed building Levels numbered 0 at the top (located near the current TP Area), to XIII (in the deep sounding of the South Area. Following a methodology of the new dating project (e.g. Bayliss *et al.* in press), the new levels were defined. They were named by letters, starting from TP M- the oldest Neolithic level, to TP W- Islamic burial ground.

Figure 4.1. Overview of the TPC trenches in relation to the South Area, TP, and Mellaart's Area A. Plan by Camilla Mazzucato.

TPC trenches were hence set up south of the the Mellaart's Area A, where remains of buildings

assigned to level I and III were discovered in the 1960's. Generally speaking, Levels I-III can be best characterized by open areas and streets. It is also worth mentioning that Level III in Area A is represented by two buildings designated by Mellaart as shrines (Shrine 1 "Hunting Shrine" and Shrine 8). These comprise the latest wall paintings at Çatalhöyük.

It seems that late buildings were restricted only to the top of the mound. During the years of research, with the exception of TP Area, there were almost no structures discovered that could correspond to the buildings of levels 0-II (Barański 2011: 124). The correspondence between TP and Mellaart sequences proved to be difficult to define. However, the preliminary analysis conducted to date seems to suggest that Mellaart's Level I corresponds to TP-M, while Level II to the levels TP-N to TP-Q.

In the beginning of 2012 excavations, Buildings 4 and 5 from Level III (according to the Mellaart's scheme) were exposed in Trench 1. As the southern wall of Building 5 was not revealed in the trench, it was decided to open up Trench 2 directly to the south. A number of features identified on the Mellaart's plans were recognized while others were not revealed (see Mellaart 1962). A major difficulty in identifying features from the Mellaart excavations was due to impossibility of establishing which of them were excavated and which only exposed and documented.

The TPC Area vs. the South Sequence (B10 & the E Shelter Section)

Trench 3 in the TPC Area was opened in order to link the stratigraphy of the other TPC trenches - and thereby, the TP sequence - to the stratigraphy of the South Area at Çatalhöyük. Accordingly, it was laid as close as possible to the South shelter's southeastern corner and its eastern edge, where Building 10 and several associated exterior spaces were excavated in past years (Kotsakis 1996, 1997; Jonsson 2003; Regan 2004). This structure and its related spaces form part of the main stratigraphic spine used to determine the longest dating sequence at Çatalhöyük.

In order to plan the new trench in a way that we would be most likely to find features linking to the architecture in both the other TPC trenches and the South area, Ground Penetrating Radar of the area was conducted. Based on these results, a trench (Trench 3), quadrilateral in shape, was mapped with southern and eastern edges being 10 m long and the northern edge measuring 6 m in length. The topography of the trench slopes steeply downward toward the south. The southern and northern edges of Trench 3 run east-west, and the eastern edge runs north-south, while the western edge runs roughly parallel to the eastern wall of the South shelter (see Figure). The GPR results suggested that the northeast corner of the trench contained evidence of a structure that would relate clearly to the structures in the other TPC trenches. We also hoped to find some architectural features in the southwest corner that would connect to the South area's Building 10 and its associated spaces.

Building 10 has been associated with Hodder Level T, and its connection with James Mellaart's phasing is currently under analysis. Space 131 lies immediately to the south, and Space 126 lies to the east; both of these spaces represent exterior midden deposits. They are most likely contemporary with each other, and both postdate the construction of Building 10. Both Space 131 and Space 126, moreover, are Neolithic in date.

Results of the excavations in Trenches 1 & 2

The Neolithic sequence

The works in this season began by removing fill left by Mellaart in the south most trench in the area excavated by his team in 1961. Buildings 4 and 5, dated to Level III, were exposed. (Figure). It made it possible to identify their layout and compared with the Mellaart plan (1962, Fig. 3). No in-built features, as identified on this plan, were discovered in Building 4, and they must have been lifted in the 1960s. Particularly evident was the situation in the area of eastern platform with two burials placed underneath. They must have been excavated my Mellaart, as indicated by a deep depression in their original location. Similarly, the centrally located hearth was also lifted. Interestingly, however, remains of the platform in SW part of the Building was preserved. Building 5 was placed directly to the south of Builidng 4. It is now located in a newly opened Trench 1. Similarly as in case of Building 4, the Mellaart plan (1962, Fig. 3) is significantly inaccurate, in particular in terms of stratigraphic interpretation of the walls.

The excavations carried out in the 2012 season made it possible to reveal a sequence of Neolithic buildings, located mainly in Trench 1. As a majority of their features have not yet been excavated, their more detailed analysis will only be possible after completion of the excavation works in the coming season.

The oldest Neolithic structure in this area is Building 110. It was probably contemporary to B.74 from the TP Area, which means it can be dated to TP-N. Its three walls (northern, eastern and southern) were exposed and documented (F. 3910, 3911, 3912). They were made of solid yellow/sandish bricks. The eastern wall of B110 F. 3910 was built is the previously prepared foundation cut. It was later filled with mixed materials (20163). This is a similar situation to B74, in particular its internal Space 327, from the TP Area. It may imply some kind of a deliberate constructional practice in the late levels. This was the time, where buildings were constructed on midden. The southern wall of the Building was completely truncated by a deliberate cut somewhere after the end of the Neolithic (see below). The Building was divided into two rooms by the E-W partition wall F. 3927. The northern part was recorded as Space 485 while the southern part as Space 486. The excavation of the sequence of layers in between the walls of B.110 has not been completed and the floor of the Building was not reached in this excavation season.

The northern room of the Building (Space 485) had a narrow elongated shape. It was filled with a pretty homogenous sequence of deposits. The earliest layer excavated this season comprised a midden (20129) placed on top of what appears to be the room infill, itself placed between the walls of the room. This was followed by a layer of brownish loose fill (20127) and then greyish loose and very homogeneous layer (20124).

The southern part of this Building (Space 486) has also not been completely recognized. A sequence of infill deposits in Space 486 was significantly different than in Space 485. The earliest layer excavated in the 2012 season was a brownish and pretty homogenous and significantly deep infill (20155). It was followed by a homogenous whitish/greyish layer (20124), which also covered the northern room of the Building (Space 485).

All layers from Space 485 and 486 clearly postdates the abandonment of Building 110, and possibly also the later Building 109 placed directly in the same area (see below). The infill

deposits were very homogeneous and made of small striations indicating its long and continuous accumulation. Their character and stratigraphic position imply the Neolithic metrics. However, a number of post-Neolithic pottery sherds found in these layers make this interpretation doubtful and may indicate that in fact the sequence may have been deposited after the end of the Neolithic. However, if this is to be true, the room infill, accumulated directly after the abandonment of the Building, must have been deliberately removed somewhere after the end of the Neolithic, and the space later filled with materials of the later date. A definite understanding of this sequence is further complicated by the Mellaart excavations. The area was certainly exposed in 1961 but it is unclear which deposits were actually excavated and whether the discussed layers may in fact have been backfilled at the end of the excavations in the early 1960s.

The southern wall of the dwelling structures directly to the north of Building 110 was partly excavated in the 2012 season. In particular, it comprises Building 4, as defined by Mellaart. However, analysis of this wall revealed that the plan published after the excavations in the 1960s is inaccurate (Mellaart 1962, Fig. 3). In fact, this wall is actually composed of two superimposed walls, one placed on top of the other.

Moreover, the oven F. 3924 (Space 494) in central part of the wall – attributed by Mellaart to Level III – belongs in fact to the older building (Mellaart 1962, Fig. 3). It was constructed against the southern wall of the Building contemporary to B 110. It was certainly in place, when the wall of the Building from Level III, was constructed. This made it possible to distinguish Building 111 defined by three walls (F. 3923, 3925, 3926). It is stratigraphically later than both Building 110 and its contemporaneous counterpart to the north. As this area was not excavated in the 2012 season, not further details of this stratigraphic sequence are available at this point. These include, among others, an attribution of the features that Mellaart linked to Building 4.

A layer of midden (20255) between N wall of Building 110 and southern wall of Building 111 was excavated. A cluster of almost 200 sheep bones (mainly astragali, phalangi, metapodials), two cattle horn cores, basalt mace, worked bones, along with a cluster of the Neolithic vessels, was exposed. They seem to be deposited after both walls were constructed. This is a deliberate deposit of ritual character.

Following the abandonment of Building 100, the area went out of use for some time. It was later occupied in the form of some kind of open space. Its surface was arguably marked by a solidly made bricky layer (20234) with fragments of a tramped floor (20256). Interestingly, large clusters of phytoliths were found on it. After some time, the activity area went out of use and this area was used as a midden (20232 & 20215). In overall, the fragment of the activity area may be indicative of a temporal inhabitation of the space, similar to the open space revealed in B. 72 and B. 73 in the TP Area. Chronological position of both sequences have not yet been established. Interestingly, the activity area postdates a solid B. 110, which is similar to the sequence in the TP Area, where open space (courtyard) in B. 72 and B. 73 emerged after the abandonment of B.74. Interestingly, B. 110 and B. 74 seems to be contemporary.

A small fragment of *in situ* occupation activities was found directly above the sequence of activity area with superimposed midden. It was badly truncated from all sides making it detached from almost any stratigraphic sequence. Their analysis and interpretation is hence very difficult. It was truncated from the north by a deliberate cut some time after the abandonment of Building 110 and a huge post-Neolithic cut from the south (see below). However, considering

a distinct character of the recognized features, it justified to attribute them to a separate Building 115 (Space 491). The most important element in this sequence was a fragment of solid construction F. 3914, located in the section between Trench 1 and 2 (Figure). Its function is difficult to define but it may have been a kind of unspecified platform. It was built directly on a midden (20215 & 20216), deposited following the abandonment of the activity area (20234), itself used after the abandonment of Building 110 (see above). It is made of a number of superimposed and distinct layers. The base of the construction was made of bricks placed directly on the midden (20213). The following layer was made of small pebbles (20207) and it may have served as a make up of the floor, placed possibly south of this sequence. Interestingly, a fragment of older floor were mixed up with these pebbles. This indicates a destruction of older building that predated this floor. The floor had a whitish plastered surface. This construction is almost identical to the floor of B. 61 in the TP Area. The 'platform's' western and southern face was lined from outside by a homogeneous silty layer (20198), similar to mortar or plaster. Both the floor and the plastered surface were made at the same time. Three distinctively yellow bricks were placed on the floor. This was certainly a deliberate act but its significance remains unclear. A fragment of short E-W partition wall, with lining from the south, was discovered east of the 'platform'.

Two distinct superimposed floors were recorded from the northern side of the 'platform'. They may have been remains of the room, possibly linked to Building 115, but truncated as a consequence of later occupational activities. The whereabouts of this room is in dark. The walls, and possibly its floor, were probably excavated by Mellaart in 1961. The W-E walls, assigned by Mellaart to B. 5 from level II, may in fact have been an element of this construction (Mellaart 1961, Fig. 3). A small but distinct fragment of floor (20212), possibly later that the floor of the 'platform', was revealed from this side. The preserved fragment has a triangular shape 9 x 7 x 14 cm. Its surface was made of up to ten plasterings and the entire sequence was c. 0,3 thick. It was placed on top of a make up made of mixed silty layer c. 1,4 – 2 cm deep. The make up itself sits on top of a brick.

Further to the east of pebble make up (20207) and a fragment of white floor F. 3957 was found. It may be a floor fragment of the later room (above the pebble make up floor). The room was located south of the 'platform'. Fragments of an unspecified wall, later significantly truncated by the huge E-W cut, were revealed.

The 'platform' and both floors, indicative of two rooms, seem to belong to Building 115. As it was only preserved in very small fragments, no details of its construction and layout are available. Stratigraphically, this Building is later than Building 110 and it is certainly earlier than Building 109 (see below). This is manifested by the fact that the eastern wall of B. 109 F. 3909 truncated the eastern fragment of the 'platform' sequence of Building 115. Details of these stratigraphic relations will be revealed in the coming excavation season.

The latest dwelling structure in this part of the TPC Area was Building 109. It probably respected both the size and layout of Building 110 - its direct predecessor. The walls were placed directly above the earlier Building. The bricks were made of greyish /beige bricks of a poor quality. They were very homogenous in terms of their length – 80-82 cm and were relatively well preserved. The two courses of bricks were recognized. This Building is possibly contemporaneous with B. 61 from the TP Area and can be tentatively dated to the Level TP.R. Building 109 was only preserved by highly truncated northern F. 3908 and eastern F. 3909 walls. Not a single feature, that may unquestionably be linked to this Building, was found. Due to a significant post-Neolithic

destruction of this part of the mound, the size of the walls and the building layout cannot be satisfactorily reconstructed. Building was most probably partly excavated in the 1960's in order to unearth earlier structural elements.

The Chalcolithic (?) sequence

The eastern F. 3910 and western F. 3912 walls of B. 110 were truncated by a huge cut of E-W alignment. It removed completely southern sections of both solid walls, the southern wall of the Building, an infill deposited between its walls (20171) following its abandonment as well as later B. 115 (see above). It is clear that this big truncation destroyed the entire Neolithic sequence, which indicates it is post-Neolithic in date. It may have happened directly after the end of the Neolithic or some time afterwards but certainly earlier the Hellenistic occupation (see below). In any case, it is almost certain that that all deposits, at the level excavated this season, south of the truncation are post-Neolithic in date. Considering its large scale, it may indicate that this cut must have been deliberate and related to some kind of construction activity. Its nature cannot be specified at this moment.

The truncation was later filled with diagonally placed layer (20284). It was pretty homogeneous, which indicates slow and continuous accumulation. A horizontal bricky layer (20285) was later deposited on top of this diagonal layer, implying a different depositional situation. Two small pits F. 3969 & F. 3968 of unspecified function later truncated this layer. They may have been Chalcolithic in date. However, this attribution can only be treated very tentatively as no radiocarbon dates are available at present. Similarly, pottery and obsidian from these pits have not yet been systematically studied. One of the pits was later truncated by a Hellenistic pit F. 3921 (see below).

The Hellenistic settlement

The next occupational level in this part of the TPC Area comprises a storage zone of some kind of unspecified settlement, probably Hellenistic in date. Altogether, 13 pits and 6 postholes have been recorded in the 2012 season. They were located in all parts of Trench 2, except for one large pit (F. 3907) placed in NW corner of Trench 1. All pits but one (F.3970) were excavated. Pits were very diverse in terms of their size, shape and type of infill. They could be best divided according to their shape into circular/ovoid and irregular. Most of them were easily distinguishable, while some others were quite indistinct. A majority of them were pretty shallow with depth ranging from 0,10 m-0,30 m (F. 3903, 3904, 3906, 3919, 3920, 3922). Their function remains difficult to define. Some pits were much deeper ranging from 0,60 to 1,25 m. The outstanding example is a very deep but relatively small pit (F.3921), probably a well. However, a majority of pits were not as deep as similar features excavated in the TP Area (Czerniak, Marciniak 2005).

Stratigraphic position of all pits is pretty straightforward. They truncated different Neolithic and post- Neolithic deposits and features. For example, olid Neolithic walls and oven (20226) were clearly visible in the sections of two pits (F. 3934 and 3935). At the bottom of another pit (F. 3920), a well preserved whitish floor was revealed.

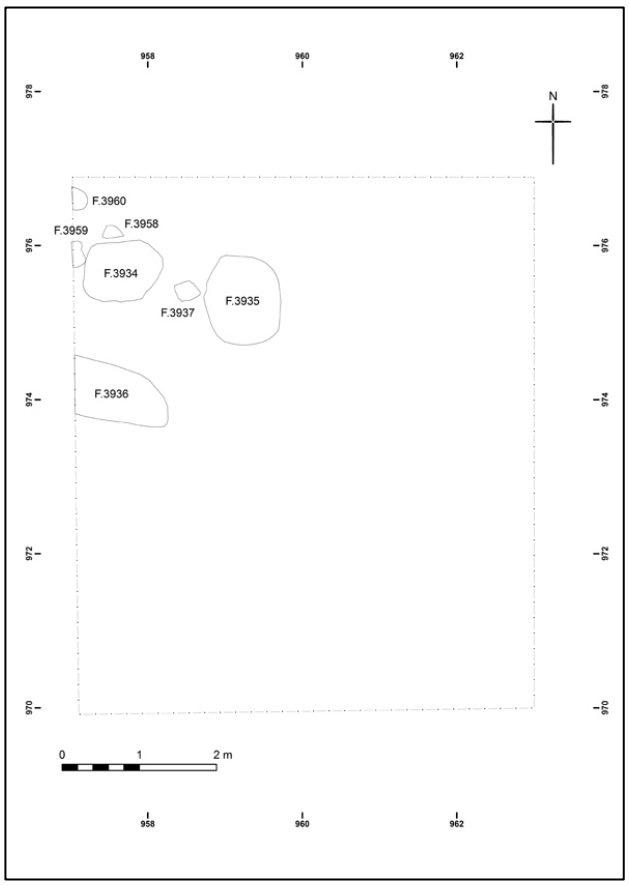

Figure 4.3. The earlier phase of Hellenistic activity. Plan by Camilla Mazzucato.

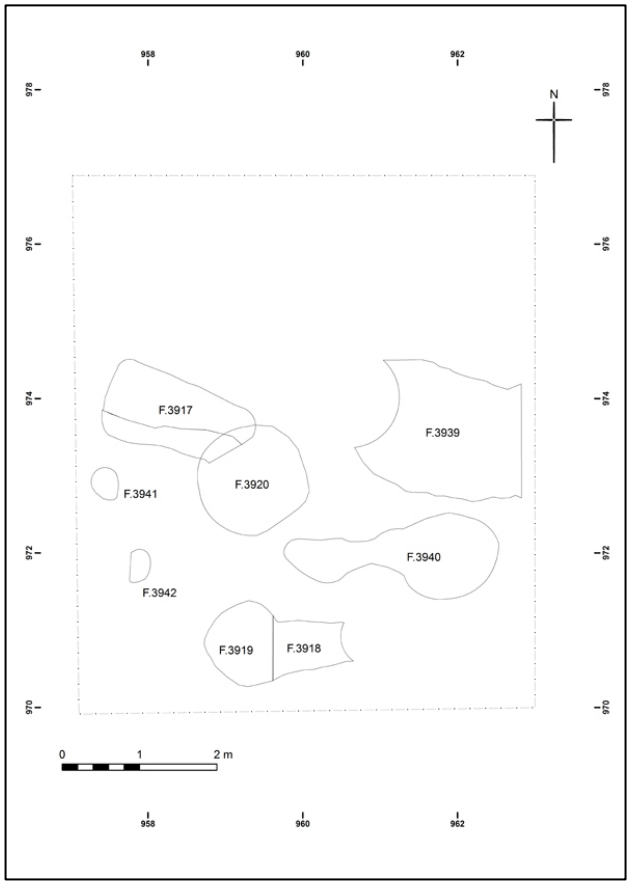

Figure 4.3. The later phase of Hellenistic activity. Plan by Camilla Mazzucato.

Interestingly, Hellenistic pits truncated each other in a couple of instances. E.g. a solid pit (F. 3921) truncated older pit (F. 3939). Based upon a stratigraphic position of the pits as well as their shape and location, two major chronological phases have been distinguished: (a) early Hellenistic, recorded as Space 495, and (b) late Hellenistic, recorded as Space 496.

The earlier Hellenistic phase (Space 495) is characterized by a cluster of three pits and five postholes, located mainly in NW corner of Trench 2, and one (unexcavated) pit F. 3970 in SW section of the trench. Two pits F. 3934 & F. 3935 were deep and circular in shape, while another pit F. 3936 was ovoid and shallow. Five postholes (F. 3937, 3941, 3958, 3959, 3960) were found in a close proximity to each other. They were small, ovoid, and not particularly deep but easily distinguishable. They might have been functionally associated with the pits, arguably serving as posts supporting light roofing above them.

The late Hellenistic phase is more complex and represented by more substantial features. Stratigraphic analysis makes it possible to distinguish two sub-phases. The earlier sub-phase is represented by two pits (F.3939 & F. 3940) and a small posthole (F. 3942). The later sub-phase is represented by three distinct categories of pits: (1) well-defined, circular 'bell- shaped' pits (F. 3919, 3920, and 3921), (2) irregular and shallow pits (two), and (3) rectangular, deep pit (one). Pits are distributed randomly across the excavated area and no spatial pattern was distinguished.

Particularly interesting were bell-shaped pits. These were elaborate constructions, possibly meant to keep foodstuffs for long periods of time. They had undercut sides and their diameter at the top was smaller than at the bottom. They may have been lined with a solid clay layer. Their

depth ranged from 60 cm to 1.25 m. The pits were backfilled with different deposits, including very homogeneous, black infill (F. 3921), heterogeneous, ashy, multicolour (F. 3920) and sandy, yellowish and very loose layer (F. 3919). Similar bell-shaped pits were also recorded in a close proximity of B. 10 from the phase South-T (previously the Summit Area) (Kotsakis 1996, 1997). The most exceptional was pit F. 3921. This almost circular feature measured 1 by 1 m and was 0,70m deep. However, it is certainly deeper as its bottom was not reached during this year season. The pit was lined with a solid thin brown clay layer.

Surprisingly, very little artifacts were found in most of the pits. There is hardly any discernible pattern in their distribution across particular categories of pits. However, in some pits, a large number of pottery was found (F. 3920). In the pit F. 3907, a big fragment of large storage vessel was discovered. A considerable number of phytoliths was recorded in pit F. 3921, while the fill of pit F. 3920 contained big fragments of the collapsed clay construction.

A stratigraphic position of the large pit F. 3907, located in NW corner of Trench 1, cannot be reliably established at this moment. It is located in a significant distance from the cluster of pits in Trench 2. However, considering its size and shape, it is more probable this is the late Hellenistic in date.

The Islamic burial ground

Recent excavations at Çatalhöyük revealed that the mound was intensively occupied in the post-Neolithic times. It served as a large graveyard in the Byzantine and early Islamic, probably for the people living in the neighbourhood. In the 2001-2003 excavation seasons, a part of a large inhumation cemetery was discovered and excavated in the TP Area (Czerniak et al. 2001, Czerniak et al. 2002, Czerniak et al. 2003). It was initially interpreted as the late Byzantine in date (Czerniak et al. 2001, Czerniak et al. 2002, Czerniak et al. 2003). However, after detailed studies, including radiocarbon dating, it became clear that a majority of burials belongs to the early Islamic period (Kwiatkowska 2009: 129).

The Muslim cemetery was located on top of the mound and was in use for a long period of time, probably from the middle of the 12th to the middle of the 17th century (the late Selcuk period). Altogether, excavations in the TP Area revealed 63 burials. Almost all skeletons were made supine east-west, with the head at the western end of the grave. There were also clusters of bones without any anatomical order, probably originating from destroyed graves. Two main types of graves were distinguished: (I) pit graves with niche, (II) and pit graves with no niche; with several variants (Kwiatkowska 2009: 132). The latter was the most popular type in the TP Area.

The works in this season comprised excavation of a number of late burials. Altogether, eight burials (6 adults and 2 children) were identified and excavated. Two of them were located in Trench 1 while the remaining six Trench 2. They were concentrated in the eastern part of both trenches and the graves seemed to be placed in rows. The bodies in extended position with their heads facing west were interred in relatively deep pits. They had elaborated superstructure in the form lining made of mudbricks around the pit circumference.

The graves truncated numerous earlier structures. Grave F. 3905 was placed along a solid Neolithic wall running N-S. The body in a supine position was probably against the wall, which may have been used as a kind of superstructure. Another grave F. 3932 (placed partially beyond

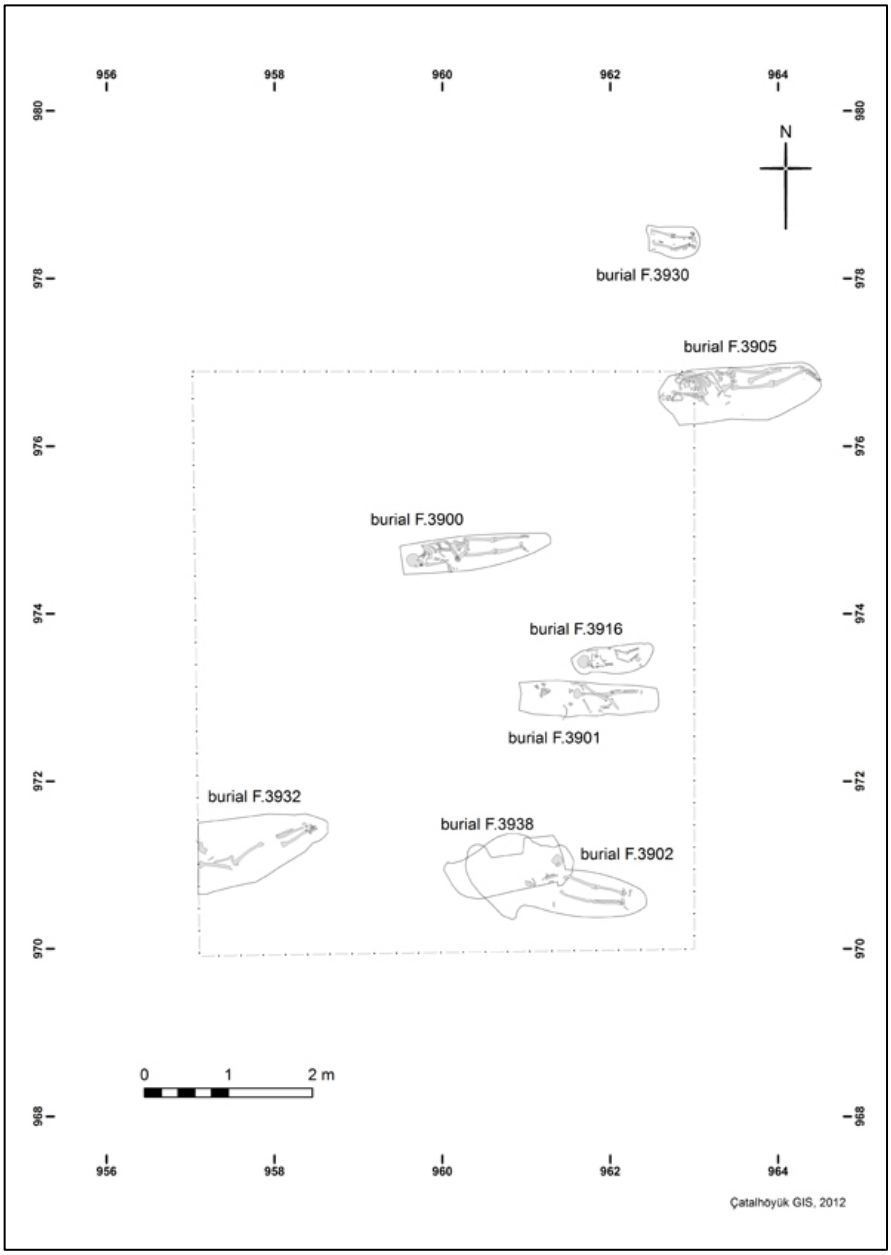

Figure 4.4.The Islamic burials excavated in the 2012 season within the TPC 1&2. Plan by Camilla Mazzucato.

the excavated area and hence only partially lifted) truncated the late Hellenistic wall (F. 3943) and the body was probably interred directly next to it. In one case, there was a direct stratigraphic relation between two burials. The cut of the burial F. 3916 of a 4-5 years old child truncated the superstructure of the older adult burial F. 3901.

Only two of the unearthed graves were in a very good state of preservation, and the skeletons were complete and in articulated position (F. 3900, 3905). The remaining skeletons were poorly preserved, probably due to post-depositional processes, such as animal burrowing. The grave F. 3902 was badly truncated by later cuts of unspecified character. A child burial F. 3930 was partially truncated and excavated by Mellaart in the 1960s campaign. The upper part of the body may have been lifted up while the lower part remained *in situ*.

In general two categories of graves were revealed in the TPC Area:

(a) with cut lined with mudbrick wall (type IIb according to Kwiatkowska 2009)

This grave type is characterized by a pit lined with mudbricks but it lacks a niche. Three graves from Trench 2 had the very distinct mudbrick superstructures placed within a cut (F. 3900, 3901, 3902). The burial cuts were relatively shallow, cuts were usually rectangular with straight walls and sharp break. Bodies were interred in individual pits, directly in the ground with no coffin. The body position was supine, head towards the West, legs extended and right leg positioned on the lateral side. They were leaned against the northern part of the grave.

(b) without construction (type IIa according to Kwiatkowska 2009)

This is a simple grave with shallow cut. The bodies were also placed in supine position with head towards the west. It seems that this type of burial is especially reserved for children, as it is represented by two examples: F 3930 and 3916.

One of the burials F. 3938 was significantly different than the remaining ones. The cut was distinct but a cluster of scattered human bones (ribs, sacrum, fragment of pelvis, humerus) was placed in eastern part of the grave.

Unlike the North area (eg. F. 3632 - a burial with a hairpin, F. 3641-with a glass vase and F. 3689 with a glass vessel, copper earrings and iron ring) no grave goods have been found in any of the graves. A trace of ochre was only found below the ribs of the skeleton in F. 3905.

As indicated by the E-W alignment of the graves, the extended, supine position of bodies, with head towards the west and facing south, the graves could be probably dated back to the Islamic period rather than the Late Byzantine.

A number of shallow, irregular pits (F. 3904, 3903, 3906) have been interpreted as belonging to this phase, as indicated by their stratigraphic position. They did not truncate any of the burials.

Results of the excavations in Trench 3

The Neolithic sequence

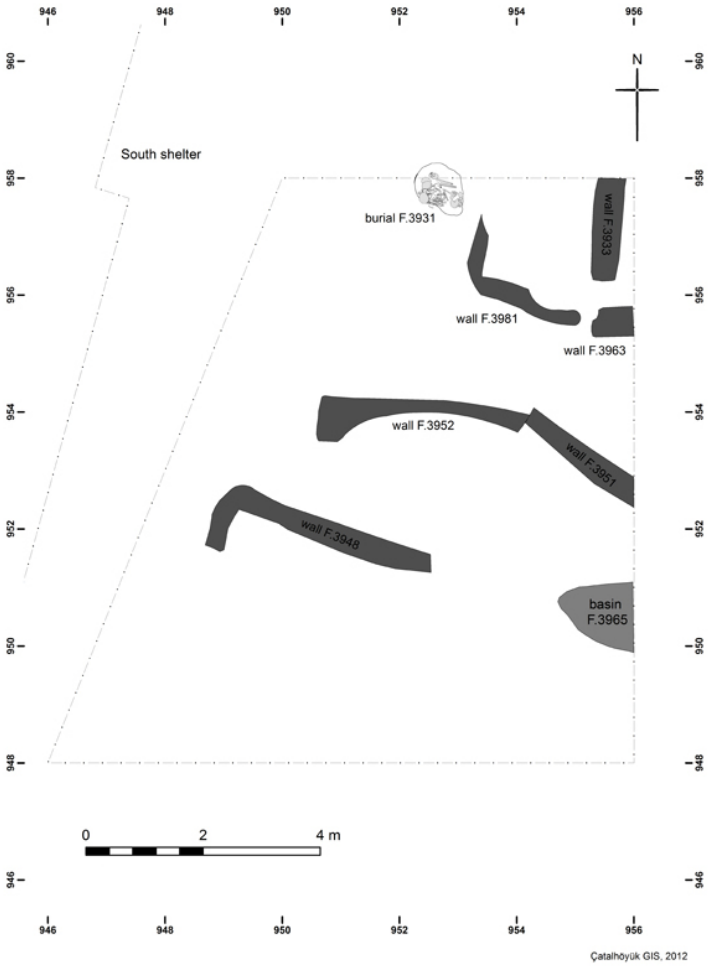

Figure 4.5. Overview of TPC Trench 3. Plan by Camilla Mazzucato.

As we continued to find late period artifacts and features in TPC Trench 3 until the end of the 2012 season, it was difficult to ascertain clear stratigraphic relationships that would allow for the secure dating of any of our features as Neolithic. However, only centimetres below the surface in the northern part of the trench, a series of Neolithic human burials were identified based on the number of individuals contained and the method of interment (F. 3931 and 3961). Altogether, remains of at least four individuals were recognized. It appears that initially, a cut (20258) was made for the burial of an adult female (20217) and a juvenile of about 8 years (20208). These individuals were allowed to partially decompose before being pushed aside to make room for the burial of an older adult female (20166). The three bodies were then covered and left for some time before a later cut (20257) was made, slightly damaging the skull of skeleton 20166. The body of an adult male (20162) was laid in this cut, and covered with a fill

indistinguishable from that surrounding the earlier bodies.

The uppermost cut for the burial dug into a wall F. 3981 curving from the northern edge of the trench, made of the kind of orange Neolithic mudbrick redeposited in several places in the trench and also exhibiting Neolithic plaster on its northern/western face. This means that both burial events must postdate the construction of this curved wall. Wall 3981's western edge meets the eastern edge of wall 3963, which extends to the east from the western limit of excavation and is likewise composed of orange mudbrick. These two walls delimit a round section of the trench's northeastern corner, which has been labelled as Space 493 (see Figure). It is segmented off from the heterogeneous layers to the south, containing features and artifacts from the Roman and Hellenistic eras. Everything within Space 493 appears to be Neolithic in date, including an extremely burnt mudbrick wall F. 3933, the uppermost courses of which were removed in the 2012 season to ensure the conservation of the rest of wall F. 3933 and the other features in Space 493. The bricks in the tallest rows of wall F. 3933 were bright pink, dry, and crumbling and at its top, wall 3933 was extremely thin—only about 20 centimetres wide. Lower down, it appears to become substantially wider. Much of Space 493 is in extremely fragile condition due to the burning that damaged wall F. 3933, although this burning postdates the construction of the walls and use of this space, since the evidence of burning extends beyond the boundary of Space 493.

The Post-Neolithic sequence

TPC Trench 3 contains a substantial amount of evidence for activity that postdates the Neolithic occupation in the area (Space 484). Excavation in the 2012 season focused on removing the heterogeneous deposits surrounding several late period walls and apparent Neolithic mudbrick deposits. These heterogeneous layers consisted of soil redeposited both by anthropogenic and natural processes as well as natural accumulation. These later contexts contained several pits and artifacts postdating the Neolithic occupation. One noteworthy find was a nearly complete Hellenistic vessel from a large layer covering the entire extent of Trench 3 immediately below the surface unit (20156).

One significant aspect of Trench 3, which strongly guided the excavation methodology, is the fact that many of the later features are located lower in elevation than the Neolithic features found in the trench, reflected in the slope of the trench. The counterintuitive discrepancies in elevation between these features suggests that the later occupants of the area cut into extant Neolithic remains to create a landscape of terraces, an interpretation which is supported by the appearance of two walls F. 3951 and 3948 in TPC Trench 3 with construction techniques suggesting a Hellenistic or Roman origin shelter (see Figure). Both walls are made of regular, square, light grey mud bricks that contrast starkly with the highly eroded orange-colored mud bricks of the Neolithic walls in the trench. Wall F. 3948 is at a significantly lower elevation than wall F. 3951, and appears to be built on a lower terrace than wall F. 3951.

Furthermore, the units immediately surrounding walls F. 3948 and F. 3951 show clear evidence of truncation predating the construction of the walls. Wall F. 3948 cuts into a section of redeposited mudbrick (20272), which resembles the construction material of the Neolithic walls in the trench (F. 3981, 3963, and 3952). Likewise, wall F. 3951 cuts into a large deposit of similar composition (20267), as well as a Neolithic wall F. 3952 underlying unit (20267) (see Figure).

Additionally, six extremely shallow pits were excavated in Space 484. None contained any finds of note, but the process of identifying and recording these features provided significant insight into the processes and patterns of erosion on the mound. All of the pits universally showed the greatest wear and damage toward their southern edges.

Final remarks

The first season in the TPC Area resulted in a satisfactory recognition and excavation of numerous post-Neolithic structures as well as identifying Neolithic deposits across different zones. The work in the next season will focus on excavating sequences in all three trenches to pursue the goals of the project. The works in Trench 1 shall involve defining the character of Building 110, in particular lifting remaining infill layers as well as reaching and excavating the floor and associated features. The works will also focus on recognizing details of the stratigraphic relations between Buildings 109 and 115. A sequence of dwelling structures, in particular Building 111, north of Trench 1, will also be excavated. The major objective of works in Trench 2 will be a removal of remaining post-Neolithic structures and strata and the recognition of details of the Neolithic occupation. Future excavation in TPC Trench 3 will involve reaching securely Neolithic levels below Space 484 while further investigating the Neolithic features within Space 493. The works will also be aimed at identifying features that might suggest a clear relationship with the midden deposits of Spaces 126 and 131, next to Building 10 in the South Area.

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5. West Mound Trench 5 Excavations 2012

Peter F. Biehl, Jana Rogasch and Eva Rosenstock

Team: Peter F. Biehl (1), Jacob Brady (1), Jennifer Byrnes (1), Clara Filet (3), Ingmar Franz (4), Daniel Griswold (1), Friederike Jürcke (2), Goce Naumov (5), David Orton (3), Sonia Ostaptchouk (6), Jana Rogasch (2), Eva Rosenstock (2), Eugen Ruzi (1), Kilian Teuwsen (2), Talu Tüntaş (2), Patrick Willett (1)

(1) SUNY Buffalo, (2) Free University Berlin, (3) Université de Paris 1, (4) Freiburg University, (5) University of Skopje, (6) Musée Nationale d'Histoire Naturelle Paris.

Summary
During a six-week field season, excavations in Trench 5 continued with a team of twelve and two workmen. After complete outlines of four buildings (B.98, B.105, B.106, B.107), and parts of at least four other buildings had been uncovered until 2011 (Biehl, Rogasch and Rosenstock 2011), the main objective of the 2012 season was to investigate the use and construction phases of these four buildings, and the ways in which they were constructed. Building infill in B.98, B.105 and B.107 as well as parts of the construction features in B.98, B.106 and B.107 were removed in order to investigate building stratigraphy and construction techniques and materials. The report will discuss

- Methodology
- Results in B.98 / B.105 / B.106 / B.107 / Space 345
- West Mound room fills
- West Mound phasing
- Outlook

Methodology

Room fill excavation has been the main focus of Trench 5 excavation in the previous years, as no unroofed/open areas have been identified so far, and as buildings are large, have high standing walls and contain a lot of fill. For reasons discussed in detail below (*General observations: West Mound room fills*), excavations in Trench 5 aim at removing and recording each micro-stratigraphic unit separately. This year, new types of deposits were encountered in B.105 (*see below: Building 105*).

A method newly employed this season was the ***de-construction of buildings*** or parts of buildings. As described below, Trench 5 buildings have complex biographies, building and use phases. The de-construction aimed at clarifying crucial issues of phasing; furthermore, walls standing up to 1.7m high became a health and safety concern and the upper building phases were therefore removed. The de-construction of the walls was done in the stratigraphic sequences established previously. Removing walls and parts of walls revealed detailed information about the stratigraphy and micro-stratigraphy of construction features as well as construction techniques and materials. Details are described below for the individual buildings. It is clear now that the buildings were constructed using different techniques and have unique biographies requiring different excavation strategies. In B.106 for example, removing single bricks and rows of bricks from the top down was the best option to study brick work, e.g.

binding corners and connections between walls and buttresses. In the rammed-earth B.98, however, this was not possible, and sectioning walls by removing a vertical slice at certain parts turned out to be the only option. Interestingly, the variety of building materials used for the buildings was larger than it was visible at the wall facades; all materials were sampled for floatation, phytoliths, and for studies of the material qualities.

The team's media officer Patrick Willett introduced ***3D recording of architectural features*** via high-resolution photography coupled with PhotoScan software which provides considerable advantage for recording complex building phasing. The software uses the EXIF data tags attached to photographs in sequential series to align and render them three-dimensionally, producing high-density point-cloud based models with photo textures mapped over. Attempting to record stratigraphic observations with 2D photos, hand-drawn plans and elevation, and in diaries and unit/feature sheets spreads out information over several places making post-excavation as well as on-site analysis, interpretation and workflow cumbersome and difficult. Though 3D recording, paired with adequate verbal descriptions, and detail photographs and drawings of crucial stratigraphic connections requires additional time on- and off-site by connecting analogue and digital documentation it is able to capture the complexity of the phasing in a completely new and comprehensive way.

In addition, Angeliki Chrysanthi undertook a research project on personal and reflexive ***video recording*** in archaeological research in Trench 5 which also advanced our documentation methods and interpretative potential for post-excavation research. All team members recorded two or three of their excavation days using the *Looxcie,* an ear mounted, small and lightweight camera. All team members found it extremely useful to record and revisit important discussions and steps in the excavation on video, and experimented with the uses of the device.

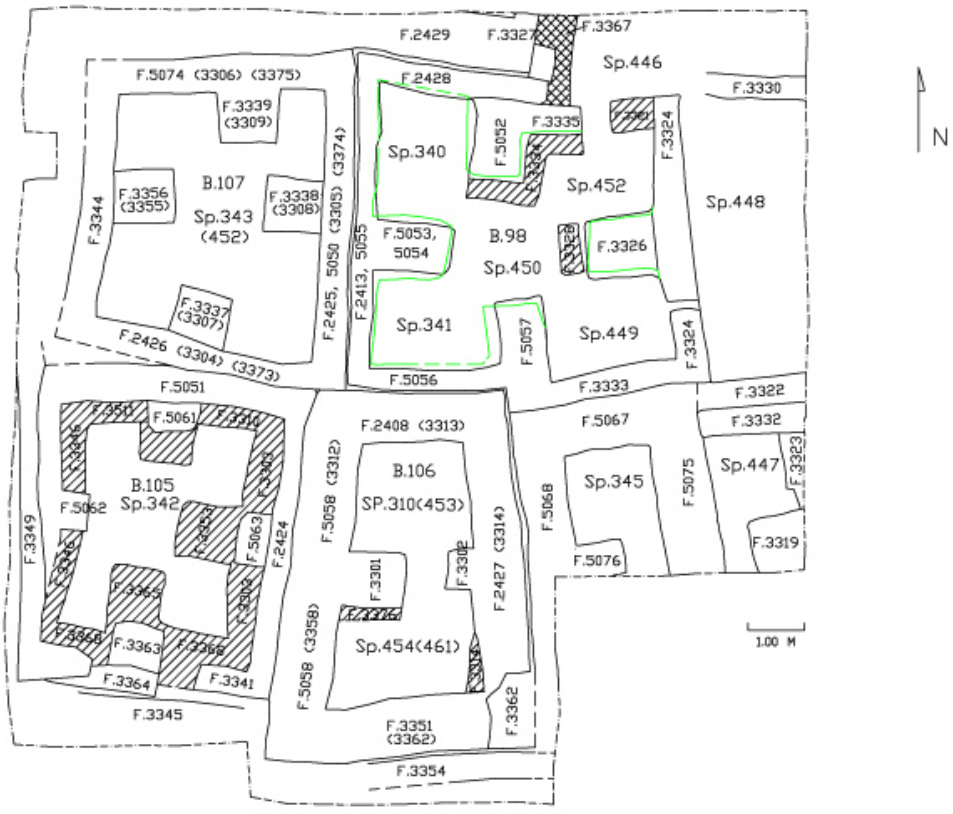

Figure 5.1. Plan of construction features in Trench 2012 recorded 2006-2012. Note that the green line in B.98 represents the outlines of the bases of the walls where they were already uncovered by excavation; the black line indicates outlines of the top part of the walls, after they were modified multiple times (plan by Patrick Willett and Jana Rogasch).

Part of this evaluation included interviews during which the team had the opportunity to provide constructive feedback about the benefits and flaws of the device and assess its impact in their research practice.

Building 98

Excavation in B.98 started out by removing a thick ***package of room fill*** still left in Space 341 **(1)**. A ***white plaster floor*** U.16977 covering the entire building was uncovered **(2)** correcting our previous understanding that we had reached the bases of walls F.2428, F.3324, F.3333, F.3369 and F.3370, and buttresses F.3336, F.5052, F.3371 and F.3372 (Biehl, Rogasch and Rosenstock 2011:42). The ***construction sequence*** **(3)** and study of the ***building materials and techniques*** **(4)** was further investigated by removing parts of the construction features after all fill had been taken out from the building. Also, a ***niche in wall F.3324 and a series of bins*** **(5)** in the northeastern corner of the building were investigated; and finally, a ***sondage into floor (16977)*** (**6**) was excavated in the southwest corner of Space 449.

(1) In previous seasons, at least one "bench" (F.3334 around F.5052), and potentially two very badly preserved additional benches (F.3328, F.3329) were found sitting within the deposits filling B.98. It was noticed that the base level of these "benches" goes along with a change in the fill characteristics: Fill in lower B.98 is a mixture of different kinds of clay with different colours, grey brick fragments, white and red plaster fragments, clay balls, large pot sherds, bone and stone tools, lithics, animal bones, horn and antler, and botanical remains – this differentiates this fill from the upper fill without these mix and a more homogeneous red-grey silty clayish matrix. We would argue that accumulation of these two different packages (*for further interpretation of fill characteristics see below, West Mound room fills*) happend with a considerable time gap in between: The lower package was deposited after the building was no longer used, but before it was eventually reused which is marked by the building of the "benches" built, to be abandoned again followed by the second fill package. As Space 341 remained unexcavated a section through its fill visible between buttresses F.5053/5054 and F.5057 clearly showed the interface between the two packages of fill described above, which differ in colour and micro-inclusions but could not in all places be separated during excavation. The lower package contained several ashy lenses roughly on the same level, and clusters of an unfired pot (16989).

Figure 5.2. Cluster U.16981 on floor U.16977 in Space 450 under excavation (photo: Patrick Willett)

(2) The well preserved white plaster floor (16977) of B.98 was first discovered during cleaning in Space 449; it covers the entire building except Space 340. The floor ended in the "entrance" to the space, and only a few a patches of it were found in its northwest and northeast corner. The irregular corners of the patches suggest that more floor, probably covering the

entire space, had existed originally, and was removed or disturbed. The floor is roughly even and flat, but slightly raised towards the walls. It is connected to the wall plaster on the lowermost parts of the walls (s*ee phases, below*). While the entire floor seems to have been constructed at the same time, different materials were used: In the doorway from Space 449 to 450 the material becomes more reddish, from Space 450 to Space 452 more greyish, without any gap or clear line visible. In two areas, patches of plaster were found on top of U.16977: just north of buttress F.3326, and in the corner of F.5052 and F.3334, where these layers seem to have been burnt. These additional layers might represent repairs of worn-out areas – with the exception of the corner of F.5052 and F.3334. A large cluster U.16981 of sherds, bone, phytoliths and bone tools was found on the floor in the centre of the building which represents part of the oldest refuse deposits in the building.

Figure 5.3. 3D model of Building 98 and Space 446 seen from east, after all infill had been removed and floor U.16977 was uncovered, before removal of construction features (photos and modelling: Patrick Willett)

(3) The phases of B.98 can be reconstructed as follows: There seemed to be packages of fill under those walls, of different height; from 5-10cm in the east (F.3326) to 60cm in Space 341 and 30cm in Space 340. At this point we suspected that the lower parts of the walls were for some reason thinner than the tops, and that their bases were hidden behind the fill. This hypothesis was tested by removing building parts. The de-construction at the same time was supposed to answer questions about construction techniques (*see 4*). It was therefore done by first scraping the outer parts of features flat to see signs of bricks, or layering, and then removing the features in slices which produced sections that would enlighten phasing. After removing all the buttresses except for the lowermost few centimetres, and taking out slices from wall F.2413/5055 in the centre of Space 341, in the corners with F.5056 and F.2428, and with

buttress F.5053/5054, the lower parts of the walls did indeed become visible. The original walls were quite thin, under 40cm. Their plaster connects to floor U.16977.

After the plaster layers had been removed, it became clear that the walls around Space 340 and Space 341 consist of two layers with different materials and techniques, and were either built at different times or constitute two 'lifts' in one construction event, a phenomenon observed on the East mound (e.g. Cessford 1998). The lowermost walls were constructed in a wet mud technique, the upper ones of brick and mortar (see 4). The interface between those two wall phases was roughly horizontal, and only preserved in the western part of the building, but not in the eastern part: Following the sloping surface of the mound, the top parts of the walls have eroded and everything east of buttresses F.5052 and F.5057 is too low for the brick layers to be preserved. The upper wall phase consists of F.5056 and F.2413/5055 with buttresses F.5053/5054 and F.5057; the lower one of F.3369 (under F.2413/5055), F.3371 (under F. 5053/5054), F.3370 (under F.5056), F.3372 (under F.5057), F.3333, F.3324, F.3326, F.2428 and F.5052.

Figure 5.4. Wall F.2413/5055 on top of wall F.3369 in Space 341, seen from east. Note dark mortar layers in the upper wall. Some patches of plaster are left on the lower wall. Fill with an ash layer is visible in front of the lowermost wall part. Note the section through buttress F.5053/5054 on top of buttress F.3371 at the right, and the dark mortar layer in the upper part. Note also the bellied facade of F.5056 on F.3370 (before removing any part of the features) on the left. Floor U.16977 is visible in the foreground (photo: Patrick Willett).

It seems that re-plastering and re-coating with mud left the upper parts of the walls thicker than their lower parts. The latter was inferred from the fact that the upper parts of features F.3369-3372, F.2428 and F.5052 are wider than their bases, and their surfaces irregular. This was interpreted as the result of a rough new mud coating having been applied before re-plastering. In Space 340, two layers of plaster (U.16987 over U.16987) were found on the western wall, and three layers (U.16897 over U.17297 over U.17298) on the southern wall. Plaster was less preserved in the rest of the building; probably two layers were found on walls of Space 340 and buttresses F.5053/5054, one on F.3326, F.5057 and F.5052. No plaster was found on F.3324 and F.3333. In short, the re-coating of the walls changed not only the thickness of the features but also their overall shape. The latter is most prominent in Space 341, where walls are "bellied", being especially thick in their middle part. The fact that the modifications on the walls' facades did not reach their bases suggests that at this time fill had already accumulated on top of floor U.16977, and consequently, the lower parts of the walls were no longer visible, and the living surface had moved up. It must be stressed that this is a reconstruction of events for the western part of the building, which was the focus of 2012 works in B.98. There might be more phases hidden in the east, which will be investigated once the western part is finished. As features in the east are only preserved 40-50cm high, parts of the biography might have eroded, though.

It is still unclear whether there was a period of fill accumulation before or after the walls were topped up with new walls. The sequence might be walls of phase 1 – fill accumulation – walls of phase 2 – re-coating/re-plastering; or alternatively, walls of phase 1 – walls of phase 2 – fill accumulation – re-coating/re-plastering. The first option is supported by the fact that the upper walls are thicker than the lower ones; this might not have happened had the original walls been visible. Would the entire height of the walls from floor to top have been visible, one would have had the impression of the walls leaning into the room. Though it cannot be excluded that the builders created such a construction intentionally it might also mean that the bases were already covered. At some point, however, the patchwork walls were plastered over so the two different phases were not visible any more. The plastering was then repeated several times.
Also the function of the continuous narrow gaps between the buildings is still unclear – there fill of fine, homogeneous deposits indicated the natural and gradual filling of these gaps. It is worth to note that a complete and well-worked flint artefact (U.18358.x1) was found in the southern part of the gap between B.98 and B.107 which seems to have been intentionally deposited there.

And finally, there is still uncertainty about the northeast corner of B.98, which only can be resolved with further excavation of Space 446; at the moment it looks like B.98 had an entrance there at some point during its life. The question is whether the opening was part of the original building layout or whether later a wall was removed to create an entrance into the building. Removing F.3320, F.3321, F.3335 and F.5052 produced some new information on the issue. Several floor layers (see Biehl, Rogasch and Rosenstock 2010:45) and the small wall features F.3320 and F.3321 are certainly later than the other features in the area, as their bases are much higher up as that of features in main part of B.98 and roughly on level with that of the aforementioned “bench” F.3334 inside the building. Under F.3320 a narrow wall F.3367 showed up that abuts F.2428, but is made from reddish brick and mortar, and thus should not have been part of any of the two construction phases of the main building. Buttress F.5052 and the small wall F.3335 east of it turned out to be one continuous wall feature with a plastered facade towards Space 446 that was cut by F.3320. The northeast corner thus has at least three phases, which at the moment cannot be connected to phases of B.98, or to anything else around it (e.g. F.3330, F.2429/F.3327). The discovery of bins in this area adds to uncertainty of the contextual relation to the different building phases of B.98.

(4) The construction techniques and materials used in B.98 can be summarised as follows: The lower phase was constructed using a wet mud technique. This could best be observed by cutting slices off the buttresses. When such a section was sprayed wet, thick layers showed up that were slightly darker or brighter. These were interpreted to be mud layers that were placed when the material was wet and consecutively trampled or otherwise compressed on top of each other. A roughly contemporary example of such a technique is reported from Bademağacı (Duru 2012:15f), which, although dated to the Early Neolithic by its excavator, has been more conclusively dated to the Late Neolithic by Schoop (2002, 2005). Is also clear now that all lower walls and buttresses seem to abut each other. The upper building phase was made from layers of mud and mortar; as no vertical mortar lines are visible this phase was not constructed from bricks but from a mud spread on the wall. Thicker mud layers are separated by thinner layers that are still referred to as mortar, as their colour indicates that they contain smaller amounts of the white marl that can be found in larger quantities in B.105 and B.106 mortars. The thinner layers probably served the same function as mortar between bricks does: to bind as well as buffer the individual mud units, allowing them to expand and contract with changes in

temperature and moisture without cracking. All features of the upper phase were constructed at the same time using this technique.

It has to be stressed that the brick and mortar of both construction phases in B.98 contained many artefacts; mainly smaller fragments of ceramics and bone, but also several unfired clay objects, lumps of yellowish-white clay, burnt clay, and charcoal. All building materials were sampled intensely but especially the lower walls in B.98 contain so much cultural debris that they might have been built from dug-up deposits from the mound.

Figure 5.5. Niche U.15337 with eroded plastering after infill had been removed (photo: Patrick Willett)

Figure 5.7. Disturbed/destroyed bins in northeastern B.98 (photo: Patrick Willett)

Figure 5.6. Clay ball cluster U.18369 and second floor U.18376 under floor U.16977 in the corner of F.3333 and F.5057 in Space 449 (photo: Patrick Willett)

(5) Two other architectural features of B.98's architecture were interesting: Niche U.15337 in southern wall F.3324 had a large fragment of ground stone 15337.x1 which was partly plastered together with the walls of the niche, potentially with the intention to close it off towards the Space 448 which might be an outside area. The other feature consists of two heavily destroyed plastered bins located between F.3335 and F.3321.

(6) In order to clarify the stratigraphy and house biography of B.98 a sondage of 60x40cm was excavated in the corner of F.5057 and F.3333 in Space 449. This sondage revealed a second layer of floor U.18376 under U.16977. The two floor layers were directly on top of each other towards the room, but not towards the wall, where the lower layer U.18376 was even and the upper layer sloped upwards; in between them, a cluster of clay balls U.18369 was found along the wall.

The cluster continues under wall F.3333, indicating that we have indeed reached the base of B.98's biography (*see the discussion about the function and meaning of clay balls summarised in Biehl, Rogasch and Rosenstock 2010:49; and also below; West Mound room fills*). Below the second floor layer U.18376, homogeneous deposits of different colours were found whose material resembles that of different walls in the trench and will be investigated in a larger area next season.

Building 105

Room fill excavation **(1)** uncovered many new construction features that allowed for the recognition of at least two **phases of construction (2)**. The relation between the two phases, and neighbouring buildings B.107 and B.106 were investigated ***removing the corner of F.5051 and F.2424*** **(3)**.

(1) Apart from the usual deposits, heavily mixed lumps of different kinds of clay, lumps of marl, small lumps of brick, fragments of wall plaster, small ash lenses, many pot sherds, animal bones and ground stone, there were different kinds of deposits: These were two heaps of heavily disintegrated brick and mortar in the northern part of the building on either side of buttress F.3365. The brick and mortar (U.18364) were the same as the ones used for the walls of B.105. The heap-like shape of the unit suggests an intentional deposition of debris and the usual accidental collapse. Most importantly, the top of a well-preserved intact part of a wall with brick and mortar lines was found lying horizontally in the very centre of the building. Also interesting is the find of pot sherds of one vessel from different and spatially separated units in the northern and southern part of the building.

(2) The construction features are all made from the dark grey brick and white mortar that is characteristic for B.105. The south wall was fully exposed and has a plastered opening – a possible entrance to the building – in the southeast corner of the building. That this gap in the wall was planned before construction, not cut in later, is indicated by the fact that two wall parts on either side (F.3341, F.3364) are not aligned. A person entering the building through the opening would have come into a space surrounded by buttresses (F.5063 and F.3363), which most likely were used to support a roof construction or an upper storey. Openings in corners were observed by Mellaart (1970) in some buildings of roughly contemporary Hacılar II and interpreted as doors. The southwest corner of the building, where the southern wall F.3364 and the western wall F.3352 should have bonded, is destroyed. Another wall F.3349 was found here that can be interpreted as later and not related to B.105 as it is not bonded to any B.105-features; also its orientation is different, and it was built from yellowish brick rather than the typical dark grey brick of B.105. It is clear now that the construction features F.3346, F.3311, F.3310 and F.3303 are running parallel to and in front of walls F.3352, F.5051 and F.2424, cannot be "benches" but are actual walls standing up to 1.3m high above the present level of excavation inside the building. Furthermore, continuations of walls F.3346 and F.3303 were uncovered in the southern part of the building as well as an EW wall F.3368 parallel to F.3311/3310 in the north. Several shapeless brick features with very eroded top parts were most likely buttresses of these walls: F.3366 in the south, F.3365 in the north, and F.3353 in the east – they were previously interpreted as a "platform". The southernmost part of F.3346 and the western part of F.3368 were also affected by destruction before wall F.3349 was built.

Figure 5.8. Model of Building 105 seen from west at the end of the 2012 season (photos and modelling: Patrick Willett)

Figure 5.9. Building 105 at the end of the 2012 season (photo: Patrick Willett)

There are three possible interpretations of the fact that B.98 is surrounded by two rings of construction features with same the layout, but different thickness and preserved heights (see Fig.8-9): First, that the building had two storeys with features of the lower storey mirroring the upper, but being considerably thicker to be able to carry the weight. The buttresses in the upper part were small compared to other buttresses found in Trench 5, and might have carried a light roof. In accordance with David French's (1998) interpretation of similar ledges (albeit lacking possible upper storey buttresses) in roughly contemporary Can Hasan I 2B, the ceiling with the floor of the upper building would have rested on the protruding lower walls. Entrance to the building would have been through the doorway into the upper, more spacious storey - in Trench 8 remains of a possible second storey were found (Erdoğu 2008). The lower and the upper walls of B.105 were set directly on top of each other, but no remains of a floor or ceiling were found so far in Trench 5 indicating that a ceiling/floor must have been removed entirely, or that the interpretation can be dismissed.

Alternatively, the building has two different phases. Looking at the example of the other buildings in the trench, the upper walls were first thought to be the younger ones. The older building would thus have consisted of thick walls and buttresses, with the internal living area actually being quite small. When the building was re-done, construction features were constructed much thinner, so the building gained internal space without actually enlarging its total size – at least not towards north (B.107) and east (B.106), whose outlines did not change.

What neighboured B.105 to the south and west is not entirely clear at the moment, due to disturbances by later wall F.3349 and Byzantine activities.

The third hypothesis is that that the lower features were put in later to support already existing walls F.3303, F.3310 etc., and would thus not represent actual new walls, but rather a reinforcement of already existing walls. The supporting walls were not built as high as the supported walls: Their tops are lower than that of the outer walls, and this is not due to preservation as shown by thick plaster on the faces of F.2424, F.5063, F.5062, F.5061, F.5051, F.3341 and F.3363. There are three observations supporting this third hypothesis: First, the very top of the lower buttress F.3366 seems to abut by only 2-3cm the very bottom of the upper F.3363, as if F.3366 was constructed later and during construction some of the material was put upwards against F.3363. This might, however, also be a misconception based on the very bad state of preservation of the top part of the older feature. Eroded brick fragments were also part of the room fill, and they might have accumulated on top of eroded F.3366 creating the impression of abutting. Second, there is no second buttress under/around F.5062, and the base of this feature goes far down. This might indicate that the bases of all other features of the upper phase also go down quite far. Third, the outer facade of the eastern wall of B.105, which became visible as neighbouring F.5058 from B.106 was removed, shows very regular brick layers, no break or irregularity was visible on the level where supposedly F.2424 would have been constructed on top of F.3303.

Evidence contradicting the supporting walls hypothesis is that there is no sign of weakness of the upper features. On the contrary, they are in a much better state than the lower features. Plaster on the upper features was very well preserved, while there was no plaster found on the lower features except for one patch in the corner of wall F.3368 and buttress F.3366. Tops and facades of all the lower construction features were extremely irregular, and must have been so before they were covered in fill, indicating a phase of abandonment and erosion. It also has to be noted that one of the neonate skeletons (U.16835) deposited in B.105, was placed directly unto F.3303, abutting wall F.2424 behind it.

It thus comes down to finding out whether e.g. wall F.3303 is a wall made from two parallel rows of brick, onto which F.2424 was put, or whether F.3303 was constructed alongside already existing F.2424; whether the thinner buttresses sit on top of the lower ones, or the lower ones were built around the plastered faces of the upper ones.

The only place where the top of an older feature was visible is that of F.3368 in the gap between F.3341 and F.3364, but the whole area and wall F.3345 south of it too disturbed to answer such an important question.

Construction features will have to be removed to clarify this. We will not start removing walls on a larger scale until the western part of the building has been clarified by taking out later wall F.3349, and until bases of lower walls have been reached. We therefore decided to choose a strategic spot as a window by removing the corner of F.5051 and F.2424 onto the level of the tops of F.3310/3303. This removal was supposed to also shed light on question of the relations between buildings discussed throughout the season. It is not impossible that, for example, F.5051, constructed onto F.3310/3311 of B.105, was overlapping slightly to cover also the edge of the top of F.3304 of B.107, as tops of these walls are roughly on the same level, before F.2426 of B.107 was built. Though this area could allow us to reconstructing a sequence of construction, abandonment and use events incorporating the entire neighbourhood, unfortunately, no

“building overlapping” could be observed. The western wall F.5058 of B.106 and the eastern wall F.2424(3303) of B.105 had only a tiny gap in between them, they even seemed to touch each other in places. Concerning the internal phasing of B.105, it brought only more confusion, as on such a small area, disturbed by rodents, it could not be decided whether we saw F.3310 and F.3303 abutting plastered faces of F.5051 and F.2424, or the top of a two-brick wide lower wall. Only the removal of walls and features on a larger scale next year will help us to better understand the construction sequence of the building/s.

(3) F.5051 and F.2426 bind into each other in the corner with smaller irregularities; in one layer there was a gap between two bricks with the size of about half a brick that was filled in with a large and thick patch of mortar. F.5051 thickened towards the top level of F.3310 and some of its bricks were protruding slightly from the facade.

Building 106

In B.106, large parts of the uppermost walls were removed this year to investigate ***construction techniques*** **(1)**, ***building materials*** **(2)** and ***phasing*** **(3)**.

(1) Before wall removal started, plaster was scraped off the facades of the upper walls and brick work documented in photos. After plaster removal, an unexpected feature became visible in form of a thick (1-4cm) plaster layer U.16999 separating the older from the younger walls. A larger area of this plaster layer was uncovered during brick removal in the southeast corner, where hardly any wall was left on top of it. The layer seals the stump and follows its undulating surface. The function of the layer is unclear, as it does not seem to enhance stability or level out the construction ground. In some places, mortar was applied on top of the plaster, but only in irregular patches, mostly the lower brick layer of the walls was put directly on top of the plaster. Only a small part of U.16999 was uncovered on the opposite side of the building, under buttress F.3301 and a part of wall F.3358. Here, the layer consisted of a patchwork of plaster and mortar. The mortar and brick layers follow the undulating surface of the older walls’ stumps underneath; this undulating is particularly strong in the case of buttress F.3302. Apparently, it was not thought important to even out this undulating.

During the removal of F.3358, F.2427, F.2408 and F.3351 one brick layer around the entire building was uncovered as an example that would then be drawn and photographed in detail. During de-construction of the brick layers above, several interesting details of the brick work were observed. Walls of B.106 have double rows of bricks, quite different from the other three buildings. Except for one brick covering and connecting both rows, these two rows run parallel without any binding. The bricks have quite regular sizes (80-85cm x 40cm x 10cm) and shapes, with rounded edges and are slightly bread-shaped in profile. Fresh and wet, they must have been quite heavy.

Unfortunately the very corner of F.2427 and F.3351 was not preserved due to late pits, but all other corners were found to be binding: one brick layer is set in a way as if its function was to cover the mortar gaps left by the layer underneath. Just as in B.107, corner of F.2425/5050 and F.5074, one corner of B.106 showed not so regular brick work: In the corner of F.3358 and F.3351, which was otherwise well preserved, were laid in unusual pattern, and some bricks did not have the regular form, but were narrower or nearly triangular. This is interpreted as the result of brick laying having started in another part of the building, and as the builders arrived in the southwest corner, they were left with a gap that could not be filled with usual bricks, so they

had to improvise and produce bricks that fitted. This corner of the building also has a peculiar shape that would have complicated laying the bricks. Improvising seems to have played a role in many other areas of the buildings, too. In some cases, especially corners, the facades of the walls seem to have had gaps and holes in them after the brick laying had been finished, and those gaps were plugged with plaster before the facades were plastered over, or during the plastering.

Buttresses F.3301 and F.3302 were not built abutting the walls, but all construction features were built as one construction with brick and mortar lines spreading from the walls into the buttresses.

(2) Removing bricks and mortar gave us the opportunity to observe their characteristics and sample intensively. It was noticed that while most bricks are of dark grey colour, very few ones are reddish-brown, a number of 1-3 bricks per wall, evenly spread out. No interpretation of this use of two different kinds of brick was made yet. Flotation samples and archive samples were taken from all materials (two kinds of brick, mortar, plaster, plugging plaster) from each individual wall, furthermore samples that can later serve to identify the kinds of mud and temper used. The remainder of the material was dry screened and turned out to contain quite a high number of bone and pot fragments. This and the fact that the pottery indicates different chronological phases (*see Franz, this Archive Report*) supports a hypothesis formulated previously, that older cultural deposits were used as sources for building material. Whether sherds were collected to deliberately temper the bricks, or whether they were dug up together with mud then processed into bricks must be decided when taking a closer look at the main matrix. The soil used for B.106 bricks seems rather homogeneous, though. It is of silty rather than clayey nature (Burcu Tung, personal communication). Also, most of the larger sherds were sticking in the mortar rather than in the bricks. That sherds were part of the rather thin mortar layers, often put in vertically, suggests they were put there during the building process. One

Figure 5.10. B.106 towards the end of the 2012 season. Note the bricks visible in the western part (left) and north; the plaster layer U.16999 with many rodent holes in the east (right); the cut of large Byzantine pit F.3331 in the south; the sloping base of removed buttress F.3302 in the east; the lowermost brick layers of buttress F.3301 in the west, and older buttress F.3376 visible in plan under it; the plastered surfaces U.16932 and U.18387 in the southern space (photo: Patrick Willett).

entire brick U.17291 was taken as a flotation sample, as was the layer of mortar U.17292 under it, to provide an idea what kinds and amount of material were in such a unit.

(3) The general picture of B.106 phasing had been established 2009-2011: two phases of walls on top of each other, the spaces with very artefact-rich deposits in which several trampled surfaces were observed. A very eroded plaster lump/surface U.18349 was found in the northeast corner of the building in 2011 that could have been the remainder of a floor belonging to the upper phase which was otherwise completely removed or disturbed. The strongest argument in favour of a floor was the finding of two pairs of horns (U.15365; Orton 2011:50, Fig.65) under it, seemingly a deliberate deposition that might explain why this piece of floor was not removed. Room fill in the southern part of the building has been heavily disturbed by massive Byzantine pit F.3331, which however managed to spare most walls. Some minor, but important new observations concerning phasing were done this year.

First, the corner of F.2427 and F.3351 of the upper building phase was so close below topsoil that it is not preserved, but the corner of F.3314 and F.3362 underneath is already showing up. Unfortunately, the outer corner of those two walls is blurred by small pits. Second, the old construction feature under the removed buttress F.3301 was now, after drying out and brushing, recognised not as a wall F.3359 dividing the older B.106 into in two spaces, but rather as a buttress F.3376 under F.3301. No second buttress was found on the opposite side, under F.3302. F.3376 was even larger than F.3301, a second mirroring buttress might therefore not have seemed necessary or possible to the builders. For the younger version of the building, a second buttress was added, but it was much smaller in size (F.3302).

Much discussion was caused by a plastered surface U.16932 found 2011 in central Space 454 south in the building, which is made up of several layers of different kinds of limy plaster, of which one seems to have been burned. It is not even, but sloped towards its middle. This shape is that of a pit bottom. The limits of pit F.3331 were easily spotted where it cut construction features, but not so easily towards the Chalcolithic room fill, as the pit also contained re-deposited Chalcolithic material, next to tile, white stones, a coin and other late finds. Last year, the deposits right above the plaster surface U.16932 could not be interpreted as Byzantine or Chalcolithic because of a total lack of finds. It remains unclear whether pit F.3331 stopped only a few centimetres above the plaster, or whether the plaster was still part of the pit. It is interesting to note that U.16932 seems to be connected to several plastered surfaces found in the corner of F.3301 and F.3358 in Space 454. This connection is physically only preserved in a tiny strip left between rodent holes. In the corner of the buttress and the wall, the transitional plaster layer U.16999 comes out from in between the walls and into the room to cover something underneath which obviously cannot be seen yet. Inside the room, the plaster layer slopes down towards the centre of the room and then, after ca.45cm, was cut by the pit. It does not spread into the corner of F.3351 and F.3358, where it might also have been cut as no regular ending is visible. This strange bench-like plaster feature was later re-plastered several times. These layers are only partly preserved; one layer (U.18387) was also smeared up against the plaster on F.3301 and F.5058; several other layers were burnt

Building 107

The focus of work in B.107 in 2012 was the investigation of the building's phasing. Through ***excavating room fill*** **(1)**, we uncovered facades of a ***third phase in the construction sequence*** **(2)**

in the eastern part of the building. This was complemented by cleaning, discussing and documenting the ***western section/elevation*** **(3)** in the building, and part of the ***uppermost construction phase*** was eventually removed **(4)**.

(1) The fill of B.107 differed from that of the other buildings from the preserved tops of the walls down to the level excavation stopped in 2011, i.e. ca. 1.6m down. It consisted nearly exclusively of very disintegrated brick material mixed with a low quantity of very fragmented artefacts. The ca. 40-50cm depth of deposits excavated this year contained many more well-preserved artefacts than in the upper parts of the buildings, and also lenses of marl and orange/yellow clay, while the main matrix was still disintegrated grey brick. Artefacts were mainly large fragments of pot, ground stone and shaped clay. The level on which the nature of the fill changed is roughly equal to the base level of walls F.3304-3306, standing on older walls F.3373-3375. However, no clear interface was found as the main matrix did not change.

(2) In 2009, an older wall phase F.3304, F.3305 and F.3306 with buttresses F.3337, F.3338 and F.3339 was found under the uppermost preserved walls F.2426, F.2425/5050 and F.5074 and their buttresses F.3307, F.3308 and F.3309. The upper buttresses were very badly preserved and their recognition further complicated by the fact that the surrounding fill also consisted of disintegrated brick. These two construction phases were recognised at a time when the westernmost part of the building was still in the baulk. In 2011, the trench was expanded to uncover the entire building. The western part of the building turned out to complicate the sequence established previously. The western wall F.3344, whose corners bind with F.2426 and F.5074, therefore belongs with the uppermost walls of the building, but is not sitting on an older wall, but on fill, as is the westernmost part of F.2426. Also, the bases of those four walls are very uneven, with the base of F.2425/5050 in the east being ca.40cm lower than that of southern F.3344, and that of F.3344 being ca. 30cm higher in the south than in the north. The western section/elevation in the building **(3)** was cleaned, documented and discussed intensely in 2012. It shows F.3344 sitting on fill mainly consisting of disintegrated brick material, with its base undulating quite heavily – too much as a result of sinking in after construction due to weak foundation ground; the wall would have broken apart if some parts of it had sunken 30cm down. Apparently the builders did not find it necessary or appropriate to even out the building ground, and built the wall onto very uneven fill. The mortar and brick layers follow the undulating base and only become more regular further up. F.3344 has a curvy outline seen from above; its weaker centre might have become pushed into the room by deposits west of it of which there is no clear impression so far because of the numerous disturbances so close under topsoil. Minor remains of wall plaster were found on F.3344, which had not been the case for any other wall in the building.

The expected fourth buttress of the building was excavated and shows two phases with the lower F.3355 consisting of the grey brick with light grey mortar that is characteristic for the second wall phase of F.3304-F.3306. Its top is very irregular, and the upper buttress F.3356 was built onto the irregular stump. F.3356 is also slightly narrower, but longer than F.3355. The upper buttress consists of the reddish brick, with hard and crumbly red-brown mortar that was also used for F.3344, F.5074, F.2425/5050 and F.2426. The two phases of the buttress can thus be related to the two wall phases based on the materials used to construct them. However, and direct stratigraphic connection is lost, because Byzantine burial F.3342 happened to cut exactly that part of F.3344 where the buttress might have connected to the wall. The base of F.3356 is ca. 50cm under the base of adjacent F.3344.

The wall that buttress F.3355 connects to, the fourth wall that goes with F.3304-F.3306 and that would have closed B.107 towards west, presumably was positioned slightly further west than its later version F.3344, maybe 30-40cm further west judging from the size of F.3355. This means that it is presently hidden behind the fill under the base of F.3344 cannot be uncovered as long as the upper wall is still in place.

Figure 5.11. The western section/elevation in Building 107; the black line indicates the base of wall F.3344; note the cut by late burial F.3342 in the middle of the section (photo: Patrick Willett)

Removing room fill brought to light a third wall phase in 2012. Under F.3304, F.3305 and F.3306, older walls F.3373, F.3374 and F.3375 were found in the western half of the building. Only ca.10-15cm of these newly discovered walls had become visible at the end of the season. Based on the visible parts, the building material does not vary much from that used for F.3304-F.3306, so they would be hard to separate visually would there not be a 3-5cm thick layer of crumbly grey, homogeneous material between the bases of the upper walls and the tops of the lower features. Just as plaster layer U.16999 in B.106, this layer separates the two wall phases visually and might also have had structural value. When two walls, especially those consisting of different materials, were bonded together, there was danger of cracking as both responded differently to changes in moisture content and temperature. The separating crumbly layer might have prevented that. It must also be said, though, that no cracked or slammed or otherwise damaged wall was ever found in Trench 5; leaning F.3344 is the worst case seen. As chaotic as the construction style might appear, it seems to have been stable.

The separation layer also highlights the fact that the transition from the third, lowermost (uncovered) to the second construction phase in B.107 seems to have been different from the transition from the second to the first. The tops of F.3373-F.3375 are quite flat and nearly even, while the irregular tops of features in the middle phase indicate a phase of weathering and erosion before the youngest features were built on top. This is especially well visible in F.3355, whose eroded top was sealed and preserved by F.3356. As mentioned before, spotting the other

three buttresses was very difficult due to disturbances; especially the lower buttresses F.3307-3309 cannot in most cases be exactly separated from the eroded brick fill around them, so nothing about their state of preservation before they were covered with new walls can be said.
The third wall phase is so far only visible east of buttresses F.3309 and F.3307, not in the western part of the building. This indicates that while room fill excavation tries to remain roughly horizontal, the interface of the two construction phases does not. It is possible that the western wall of this lowermost phase will be found further west than F.3344, under the western wall of the middle phase, and thus also cannot be seen at the moment; it could also have been positioned further east or further west, though. Strikingly, buttresses F.3307-3309 seem to abut both lower wall phases: F.3304-3306 and F.3373-3375. At least no base of the buttresses or indication of older buttresses under them was found yet.

(4) Wall F.3344, going along with the uppermost preserved phase of the building, seems to have been built further east than expected earlier versions of this western wall, going along with the two earlier phases. The earlier walls cannot be found, as presumably they are still covered in the fill that became the foundation of F.3344. The latter must therefore be removed to find those earlier walls. We decided to remove the entire upper building phase in a similar manner than that employed with B.106 and started with the corners of F.3344 with F.2426, of F.2426 with F.2425/5050 and of F.2425/5050 with F.5074, which were found to be bonded. The latter corner is badly disturbed by animal holes, but there are indications that the binding might have been less regular here, with smaller chunks of bricks filling in gaps between regular bricks.

Space 345

During room fill excavation in Space 345, two floors on top of each other were found ca. 65cm below the preserved top of the walls, and 40cm higher up than floor U.16977 in neighbouring Space 449 of B.98. Floor U.17277, consisting of off-white marl, was only preserved in the centre of the room and had been applied on top of a layer of greenish-grey clay U.17294 of varying thickness. Compared to the fine white marl, the green clay with its many botanic inclusions was a much coarser material. Its varying thickness was probably the result of the green layer having been applied onto the room fill below without this fill having been levelled out beforehand. It might represent a floor in itself, or a floor-preparation layer for the white layer. The floor level might go along with a phase border in the surrounding walls: there were indications that walls F.5068, F.5067 and F.5075 are standing on top of older, thinner walls. The latter are only visible a few centimetres high at the moment, so it is too early to confirm this; the observation might also be a groove-like feature in a continuous wall. Unfortunately, the connection between the walls and the two floor layers U.16977 is very badly preserved as usual, the result of millennia of activity by marl-loving rodents. In places, the floors seem to run up to walls F.5068, F.5067 and F.5075, in some places they seem to run under them. The latter case would confirm the existence of two phases, the first would not exclude it. That the floor was laid before the related walls F.5068, F.5067 and F.5075 were constructed is not unlikely. The fill below and above the floor layers was a typical mixture of clayey and silty deposits of different colours, containing rather lower numbers of pot sherds, animal bones, and other artefacts compared to the package of fill above, excavated in 2011.

West Mound room fills

Room fills in Trench 5 are interpreted to be the result of multiple depositional events on a small or very small scale. The abandoned buildings seem to have been used, supposedly by inhabitants

of near-by, still occupied buildings, to dispose of unwanted broken (and unbroken!) tools and pots, figurines, clay balls, kitchen waste, left-over raw materials and production waste, and building debris. The fills therefore contain numerous interesting artefacts, animal bones, botanic remains, and fragmented building parts (see Archive Reports by Amy Bogaard and Michael Charles, Ingmar Franz, David Orton, Sonia Ostaptchouk and Philippa Ryan 2007-2011). So far, no case of material having been brought in by non-human agents, such as erosion or collapse, was identified with certainty. One depositional event is defined one hand- or basket-full of material having been deposited in the building. Great caution is therefore employed during the excavation process to identify those depositional events and their micro-stratigraphy. Indicators are clusters of a certain kind of artefacts, or a lense of fill characterised by the density of a certain kind of inclusion not present in the surrounding fill. There still remain a lot of cases where deposits could not with certainty be separated during the excavation.

This disposal must have been done from above, as there are no gaps between houses and so far no secure entrances on ground level. This firstly indicates that roofs and ceilings must have been partially or completely destroyed at the time. Secondly it makes it likely that the surrounding buildings were still intact and in use, and that their inhabitants were the ones disposing into the abandoned buildings. This scenario of post-abandonment use of houses is a common phenomenon in modern Anatolian villages (Blum 2003) and also puts the West Mound room fill into the tradition of East Mound middens: A spot within the settlement presently not used for habitation is used – sometimes for considerable time spans (Shillito 2011:108) – as an area for waste disposal, including human faeces (Matthews 2004:381) and can build up to large piles of refuse (for examples of a sequence of alternating use of a certain spot as midden, pitting and inhabited area see e.g. McCann 2007:78-79; and Yeomans 2008:Fig.36). East Mound midden areas were also used for a range of activities other than disposal, including lighting fires (Yeomans 2008:55, 57; Regan, Sadarangani and Taylor 2008:65; Eddisford, Regan and Taylor 2009:159) to char plants (Matthews 2004:381, 384) and burn lime (Matthews 2004:381, 387-389) and fire pottery (Shillito 2011:Tab.8.1); furthermore retrieval of material for construction (Stevanovic and Tringham 2003:38; Yeomans 2006:Fig.19, Fig.20; Doherty 2007:369-370; Shillito 2011:107), animal penning (Matthews 2004:381, 389-391; Shillito 2011:Tab.8.1, 107-110) even under constructed roofs (Matthews 2004:391), and deposition of clay balls (e.g. Atalay 2009:Tab. 22) and figurines (e.g. Nakamura and Meskell 2007). Trampled surfaces were observed in East Mound midden (Yeomans 2008:57; Shillito 2009:154, Fig. 135; Shillito 2011:Tab.8.1), supporting the impression that people walked into the midden areas to perform different activities here. Several surfaces were also found in the midden-roomfills of B.98, B.105 and B.106 in Trench 5 (U.16947, U.18341, U.18348). There is evidence for activities other thaN disposal being performed in B.105: the deposition of two neonate skeletons (U.16835 and U. 18333) as well as an ephemeral fireplace (U. 18345) surrounded by potstands suggests other short-term activities in these abandoned buildings (Biehl and Rosenstock 2009:39). The two neonates (U.16835, U.18333) were found deposited next to wall F.5051 and buttress F.5061 in the upper fill of B.105. Neonates were also found in East Mound midden in and outside of houses (Hager 2005:139; Regan 2007:106).

As the materials put into abandoned B.98, B.105-107 were in many cases still usable (*see below*), one could interpret the room fill-middens as a form of storage rather than refuse disposal (as Shillito 2011:107 has argued for the East Mound). However, there is only one case where with certainty we identified a cluster of materials that probably were not meant for disposal: a large pile of several hundred clay balls (U.15343) in the southeastern corner of Sp.449 excavated in 2010. The clay balls might have been stored there (they have been interpreted as raw material

for the production of clay artefacts by Franz 2010:79) – they were certainly intentionally deposited/stored there. Clay ball clusters, of smaller size, were also found in East Mound midden (Atalay 2009:Tab. 22), but seemingly interpreted as refuse there.

One important difference between West and East Mound middens is the striking lack of the ash that turns nearly all East Mound middens and the faces of their excavators black. Only a few ashy deposits have been observed in the lower parts of the fill in Space 340 and 341 in B.98 (U.16951, U.16980) and in upper B.105 (U.17259) recently. On the West Mound, ash thus was disposed off in a different manner, an interesting change in refuse behaviour. Ash seemingly was mixed into West Mound bricks (observations in Trench 5, and also Doherty 2009; no ash seems to have been found in East Mound bricks), but not all ash produced by daily fires throughout the large settlement could have been used up in that manner.

Figure 5.12. Ashy fill U.16951 in Space 340 (photo: Patrick Willett)

Also, East Mound middens seem to be generally made up of very fine layers spanning larger areas (Yeomans 2006; Regan, Sadarangani and Taylor 2008:65-66, Fig.41; Shillito 2009:Fig. 133, 134), while lenses and clusters identified in Trench 5 were thicker and covered a smaller area. The thin layers in East Mound midden might be the result the deposits having been affected by wind, rain (evidence of erosion: Yeomans 2006; of natural silting: Brown 2006:88; of weathering of bones: Russell, Twiss and Martin 2007:152-153; but see Shillito 2011:108 who did not find evidence of water or wind laid deposits in thin sections), animals (evidence for dog activity on animal bones from midden: Russell, Twiss and Martin 2007: 153, 155; Russell and Twiss 2008:111) and people after their deposition, indicating that most or all fill lenses lay open for a while before they were covered by more refuse (Brown 2006:88; micromorphological evidence for a gradual accumulation process see Koromila 2010:145; and for evidence of cases of quicker accumulation see Koromila 2010: 146; and Russell, Twiss and Martin 2007:152, 154). On the contrary, the good preservation especially of animal bones indicates that while many small-scale events led to the build-up of the middens inside West Mound houses, the entire process until a building was filled in to the top of its ruinous walls happened rather quickly in many cases (Orton 2009; see also Orton 2010:55 and 2011:51 for a discussion of different rates of accumulation in different deposits). This indicates that the midden was used by a lot of households and/ or that disposal practises were rather wasteful. The former is further supported by the finding of large, unweathered pot sherds and much unfired pottery, well preserved with painting. The latter can be inferred from the finding of complete tools and ornamental artefacts (e.g. Ostaptchouk 2009:Fig.107; Franz 2010:Fig.63; Biehl, Rogasch and Rosenstock 2011:Fig.61; Ostaptchouk 2011:Fig.105.1-2), still exploitable parts of animals (Orton 2010:55, 2011:51), usable raw materials (e.g. for pottery production Franz 2009:47, Fig. 45; Franz 2010:78-80; for lithic production: Ostaptchouk 2009:124, Fig.110; for bone artefacts: Orton 2011:49, Fig.65), repairable or complete pots (see e.g. Franz 2009:Fig.44; Franz

2010:Fig.67), and complete or nearly complete shaped and painted, but unfired pots (e.g. Franz 2009:45) in the room fills.

Figure 5.13. Examples of (nearly) complete artefacts found in the room fills. From top left, clockwise: figurine (15160.x24, Space 449 in B.98); bone bead? (15160.x5, Space 449 in B.98); needle-like bone artefact (15177.x1, Space 450 in B.98); bone pin with animal-ornament (15180.x6, Space 449 in B.98); (photos: Ingmar Franz)

However, the character of fills differs between buildings in Trench 5, and between their individual fill phases. For example, while the fill in lower B.98 shows the characteristics of rapid infilling described before, the upper fill packages, which were interpreted to belong to a later phase of infilling (*see above, B.98*), does not. The more mixed nature of the upper deposits, and the lower frequencies on clusters of larger fragments of bone and pot might indicate a slower infilling process, during which the deposits were affected by wind, rain, and animals, or a tertiary nature of the deposition (*see below*). Space 345 (*see above*) seems to show an alternation of the two kinds of fill. The finding of fitting sherds in opposite parts of B.106 in 2012 (*see above*) also indicates post-depositions mixing. The fill of B.107 is of a completely different nature altogether, consisting mostly of disintegrated brick material with a low quantity of finds which based on the characteristics could be a tertiary deposit. In the lowest excavated parts of its fill, these characteristics changed with more large artefacts found (*see above, Building 107*).

The fact that many deposits identified by the excavators as one depositional (= stratigraphic) unit contain, evenly mixed together, materials that most probably were not part of one context

during their use life, such as parts of several broken pots, fragments of removed wall plaster, and some unshaped clay or clay balls (e.g. U.16950), indicate either that many of the units represent tertiary deposits (also observed on the East Mound, e.g. Matthews 2004:386): the materials initially were deposited and mixed somewhere else, and then removed from this place and brought into B.98, B.105, B.106 or B.107. Or they were mixed by some processes happening inside those buildings after the deposition. The finding of isolated fragments of human bone (e.g. in U.18365 in Space 345 this year) supports the first option. Fragmented human bones are also a regular component of East Mound midden (e.g. Hager and Haddow 2009).

Figure 5.14. Room fill (U.15340) with many clay balls, large sherds and bones in Space 450 seen from west; in the upper right corner clay balls in Space 449 are visible (photo: Laura Harrison)

Figure 5.15. Detail of deposit (U.15389) with many construction materials in Space 449 (photo: Patrick Willett)

However, there are also several cases of units that can be identified as primary deposits. One example are clusters of large and well preserved fragments of artefacts, such as U.16981 on floor U.16977 in Space 450 in B.98, excavated this year, and many examples from Spaces 449/450 (e.g. U.15160, U.15377), Space 310 (U.17241, U.18319) and B.105 (U.15368, U.18325). Articulated and well-preserved animal bones also identify a deposit as primary (Orton 2009:72), for example U.18309, U.18311 and U.18328 in the fill of B.105. Just as the tertiary deposits, these are interpreted to be the result of disposal activities, with the exceptions discussed above.

The clay ball cluster, neonate burials, fire spots and walking surfaces found in Trench 5 room fill, together with the observation of activities performed in East Mound midden, indicate that "midden were not considered 'rubbish' but rather were important resources that were frequently used in construction, and areas of the site that were also used for in situ activity" (Shillito 2011:107; see Martin and Russell 2000 with a similar notion, but Hodder 2010:6 with a contrary one). The observation of Matthews (2004:387, 391) that lime burning areas might have been prepared building some kind of superstructure and that animals pens identified in East Mound midden must have been roofed shows that the activities were frequent and important enough to spend extra energy and resources on these ruins and "uninhabited places". Midden between buildings and in abandoned buildings thus probably were, in East and West, no 'dead' or unclean areas to be avoided, but public spaces to perform important daily activities and meet others (see Regan 2011:21 for an

imagination of children playing in midden areas), and these ruins might have seen more activities and human interaction during a day than the insides of the houses did.

West Mound phasing

Establishing 'phases' of use in West Mound buildings has to take into account their unique characteristics. First, there are different indicators for building use. There are two main indicators for identifying building use, and changes of use: construction features (including walls, buttresses, benches, floors, niches, bins, and their plastering), and artefacts or materials found between them. 'Use' combines all activities carried out in the buildings from their construction to a point when no person interacted with it walls and/or fill any more, thus including what is referred to as 'abandonment'.

As described in detail above (*West Mound room fills*), all deposits found inside the buildings accumulated during a post-use after a supposed initial use of the buildings not as a midden area. Not a single deposit indicating the original use of any of the buildings in Trench 5 was found so far, so that interpretation of their original use has to rely on the construction features alone. In B.105, B.106 and B.107, no floor and no internal furnishing has been found yet, leaving us with walls and buttresses to interpret what people might have done in those buildings. B.98 with its floor, niche, bins, and benches, can be interpreted as a living area based on this evidence. The lack of a hearth like the one found in the structures called B.25 (Gibson and Last 2003) on the West Mound, or an oven, however, speaks against such an interpretation. Among different possible other functions, storage seems most plausible. As has been discussed in earlier reports (Biehl and Rosenstock 2008:96-97), the thickness of the buttresses in all buildings might indicate that they were carrying more than just a flat roof, potentially a second storey. No evidence for the existence of such a storey, or of activities carried out in it, was found yet. Trench 5 construction features indicate that buildings, and the lives of people related to them, underwent multiple changes over the years, with features being built, rebuilt, modified, and possibly removed (*see below*).

Figure 5.14. Original outlines of F.3369 and F.3370 in the southwest corner of B.98 after removing the upper parts of the walls. The step of fill left in front of F.3370 (up) indicates the width of the upper part of the wall. In front of F.3369 (right), the fill has already been removed and floor U.16977 is visible running up to the wall plaster (photo: Patrick Willett).

At the moment, we can bring the construction features of one building into stratigraphic sequences. With a few more question marks, we can also stratify fill units. With few exceptions, establishing stratigraphic links between construction history and fill deposits is complicated and will have to be analysed carefully after the excavation. Difficulties to grasp phasing during excavation, during documentation and during interpretation, is due to the fact that one does not expect to see what seems to have happened, but expects a different kind of phasing, especially having in mind East Mound building biographies. The following examples are the most prominent cases:

1. The bases of many walls and buttresses do not go along with a floor, trampled surface, or major interface between fill packages. This is the case for the bases of F.2408, F.2427, F.3351 and F.5058 with buttresses F.3301 and F.3302 in B.106; for F.3344, F.5074, F.2425/5050 and F.2426 in B.107; for F.2413/5055, F.2428, F.3324, F.5056, F.3333 and buttresses F.5053/5054 and F.5057 in B.98; and for F.3352, F.5051, F-2424, F.3341, F.3364 and buttresses F.5062, F.5061, F.5063 and F.3363 in B.105. One exception is the bases of "bench" F.3334 in B.98, which goes along with the border of two major fill phases. Another possible exception might be the bases of B.107's middle wall phase (F.3304, F.3305 and F.3306); in this case, however, the change in the nature of the fill concerns only the number or artefacts found in it, all other characteristics did not change, and no surface was found. Surfaces found in the room fills of B.105, B.98, B.106 (see above, *West Mound room fills*) are not on one level with bases or tops of construction features.

2. Furthermore, in all cases listed above, with the exception of B.98 and the bases of F.3304, F.3305 and F.3306 in B.107, the bases of walls and buttresses are so irregular (especially F.3344, F.3302) that if one were to imagine a floor or surface following those bases, the result would not resemble a living surface. This suggests that there simply was no floor going along with the bases, and that instead of suspecting that such an interface or surface was missed during excavation, an interpretation of the phenomenon seems more helpful.

3. Buttresses F.3309, F.3308 and F.3307 in B.107 were built abutting walls from two phases: The phase of F.3304, F.3305 and F.3306, and walls F.3373-3375 below. Buttress F.5062 in B.105 might be a similar case, but this area is still blurred by destruction from later wall F.3349.

This evidence seems to suggest quite clearly that the bases of walls very often do not represent the level on which living surfaces were located.

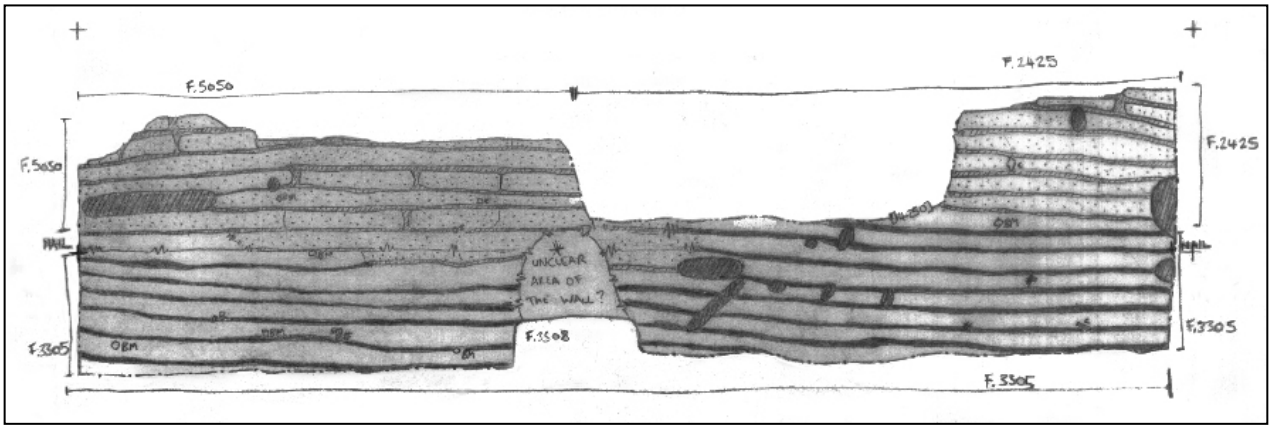

Figure 5.15. Drawing of wall F.2425/5050 on top of wall F.3305 in eastern B.107 (drawing: Patrick Willett and Thomas Birch)

This can be explained by seeing the phenomenon of walls constructed on top of older walls as maintenance and repair of an existing building rather than the beginning of a new building with a new use life. We therefore for now refer to the sequences of walls erected on top of each other, and the spaces they surround, as different versions and phases of one building, not different buildings. What where the reasons of topping up old walls by constructing new ones of top? The old walls might have been in a bad state, for example following a period of abandonment that let the house decay. Experimental work in Aşıklı Höyük shows that with no efforts of upkeeping, roof and walls of a mud house that endured 2-3 Central Anatolian winters will be in bad shape (M. Özbaşaran, personal communication). The phase of abandonment does

therefore not have been very long. There might also have been other reasons that made the walls not seem proper any more. In some cases we can suspect that the improper walls were cut into stumps with more or less even surface: tops of F.3369-3372 in B.98 are rather flat, and those of the phase of F.3373-3375 in B.107 also. In B.106, the tops of these stumps were even sealed with a plaster layer that probably had no structural value. In some cases, the wall repair was used to alter the layout of buildings, e.g. when B.105 was enlarged and provided with a doorway (if the upper walls are younger than the lower ones, *see B.105 discussion*), or B.107 was reduced in size in its latest phase.

As walls were repaired, the older (lower) walls, or parts of them, where still standing and in use together with the new walls. In many cases, then, people lived in a building surrounded by walls whose lower parts were older than their upper parts. The patchwork might not always have been visible, when it was covered in plaster, as in B.98.

The questions remains where were the living surfaces used by the people living between patchwork walls? In the northeast corner of Space 310 in B.106, potential remains of a removed plaster floor U.18349 were found ca.15-20cm below the bases of walls F.2408 and F.2427. This floor, if it was one, would have belonged with the phase of those two walls, but physically was abutting walls F.3313 and F.3314 below them. If there were plastered floors at any level in B.98, B.106 or B.107, they must have been removed with such care that not the smallest remains were left, for example where the floor met the walls. Removal of floors is not improbable, thinking that limy plaster might have become a rare good at some point in time and can be re-used easily, a practice known from wall plaster on the East mound (Matthews 1999). Also some walls, e.g. all walls in B.107 or lower walls in B.105 and eastern walls in B.98 lack the plastered surface that might be expected. Why, however, were some floors and walls stripped of their plaster and some not? Maybe only certain quantities were needed. If the removal of plaster served only the sourcing of raw materials, however, floor removal would not have been so thorough that no traces remained, with the exception of U.18349 in northeastern B.106 and U.16977 in Space 340 in B.98.
Some walking levels can be inferred from features such as “bench” F.3334 in B.98, or the doorway in southern B.105, upper phase. Walking surfaces might not have been on constructed floors, then; but no trampled surface spanning entire buildings was found during excavation.

Figure 5.16. Detail of F.3334 constructed on top of fill in Space 450 in B.98 (photo: Patrick Willett)

There are several cases where walls belonging to two construction phases must have been used together. First, the two phases of B.98, which were covered by continuous plaster layers. Second, the potential floor of the upper phase of B.106. Third, the buttresses F.3337, F.3338 and F.3339 which where built abutting walls F.3373-F.3375, and also walls F.3304, F.3305 and F.3306 on top.

There are also two cases, where changes in the layout of buildings were such that old walls cannot have been in used together with new walls: First, F.3344 in the uppermost phase of B.107 was constructed on top of fill that had accumulated between older walls. Curiously, the other walls of this phase do stand on top of older walls, their bases being lower than that of F.3344. Where was the surface of this new building? It must have been at the base of F.3344 or above, if we do not want to suspect that the inhabitants liked looking at a package of fill under their western wall. The lower parts of the other three walls constructed with F.3344, and the buttresses, must therefore have been below the floor level. The builders apparently wanted to situate these walls on the older stumps, but did not bring the fill package under F.3344 to the same level. A similar case might be the upper version of B.105, potentially a larger copy of the older version, which was probably abandoned when the new, large building was constructed (phasing problems in B.105 *see above*). In this case, too, the base of one buttress (F.5062) is considerably lower than the bases of all other walls and buttresses of the upper phase.
In short, it might be possible that the surrounding walls continue further down beyond the level of floor U.16977 in B.98; it is also possible that this floor represents an actual start of a building biography.

For these reasons, we prefer to present the biographies of West Mound buildings as a series of events rather than in larger "building phases". It is one of our objectives to study relations between these unique building biographies by finding out which version of which building was contemporary with which version of which other building, and so to be able to interpret overall pattern and processes in the neighbourhood. De-constructing buildings allows us to start investigating direct stratigraphic links between the buildings, most importantly in the centre of the trench, where all four complete buildings meet. We started removing walls of all four buildings in this particular area, but so far did not find anything telling us which wall might be earlier than another wall (*see Building 105* ***(2)*** *and B.98* ***(3)***). So far we are left with observations concerning the layout of buildings. The south wall of B.98, for example, in both construction phases has a dog-legged shape that could be the result of this building having been constructed next to already existing B.106 and Space 345. The very pointy southwest corner of B.106 could be interpreted similarly, meaning that this building is younger than B.105, and younger than two buildings to the south and southeast that are still unexcavated except for their north walls. The opening in southern B.105 indicates that the building going with wall F.3345, blocking a doorway, to the south had not been constructed yet.

A biography as that of buildings in Trench 5 results in the living horizon being moved upwards in the courses of years, while walls were topped up so the lowermost part of the building became filled with refuse and fell out of use. This scenario indicates phases of abandonment, infilling and erosion, before the building was newly repaired and occupied. Should this interpretation maintain as West Mound excavations proceed, it would characterise the period as that of unstable conditions with people changing their habitat frequently. Alternatively, it could be suggested that a rather fluid and impermanent lifestyle was normal for West Mound inhabitants, not a sign of crisis (see Bernbeck 2008 stating this for roughly contemporary groups in the upper Euphrates valley). Either way, people who created the building biographies in Trench 5 had notions about the proper ways to construct, use and abandon buildings that are fundamentally different from the archaeologists' expectations, from that of their East Mound predecessors, and potentially from that of earlier West Mound inhabitants. Referring to the latter, it would be extremely interesting to find out whether the rather chaotic way people used and modified Buildings 98, 105, 106 and 107 was different from that in earlier West Mound buildings, and

might indicate a change of social structures during West Mound occupation and/or a potential phase of stress and troubles. We will have to wait for the exposure of deeper layers to answer that question.

Outlook

In the next season, excavation of room fill in B.106, B.107 and B.105 will continue as part of the study of building use lives and in the hope to find more preserved floors. Issues of phasing outlined above will further be investigated by deconstructing parts of buildings, which also allows for the observation of building materials and construction techniques. We will continue to focus on B.98 and plan to excavate below its floor and eventually remove the whole building in order to investigate its predecessor.

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6. West Mound Trench 8, 2012

Burçin Erdoğu (Trakya University)

Figure 6.1. Building 94

The last season of fieldwork of the University of Thrace, Edirne run at the end of June undertaking excavations in Building 94 and space 481 underlying it. The first aim of this year's excavation was to reach the floors of Building 94, which was first excavated in 2010. B.94 is a rectangular building measure ca. 5 x 8 m. It has its own walls, though it was separated by ca. 0.4/ 0.5 m from the neighboring Building 78 (Figures 6.1 & 6.2).

Figure 6.2. Plan of B.94 and B.78

Overall the structure was demarcated on the western, northern and southern sides, respectively by walls and internal buttress F.2972, F.2970/2969, F.2973, F.2971 and F.2974. The building has two buttresses. The northern buttress (F.2971) measures 0.8x0.75 m while the southern buttress (F.2974) measures 0.7x 0.9m. There was a crawl-space or doorway on the southern wall, just nearby the buttress F.2974. A bench (F.3801) lies at the northeastern corner with a width of 0.50 m. A bench-like feature (F.3802) was also located at the southeast corner. The building has a uneven floor consists of a compact whitish colored layer, relatively rich in finds such as pottery sherds, animal bones, shells and chipped stones. A sherd with a human figure is noteworthy (Figure 6.3).

This season of excavation was also concentrated on space 481 underlying Building 94. An area of c. 2.5x3.5 m. was opened up in the north of the building to create an artificial section. Upstanding walls (F. 3806 & F.3807) and buttress (F.3803 & F.3804) of the underlying building have been revealed. The underlying northern buttress (F. 3803) measures 0.9x1.00 m. It is clear in the section that the northern buttress of B.94 has been built on infill of the underlying building (Figure 6.4). A low bench (F.3805) with a silty clay kerb laid just west side of the buttress. A red painted plaster collapse was found near the bench. The western buttress is also large measures 1.00x1.10 m and attached the wall F.3806. Both buttress and walls have been plastered with the finely laminated plaster.

We have been working at Çatalhöyük for 6 years. Our fieldwork came to an end this year. Çatalhöyük has given us incredible opportunities in terms of working in the site and discussions with large number of specialists. I wish to express my deepest thanks to Ian Hodder for graciously inviting me to join the Çatalhöyük Project. I also wish to thank my students and colleagues Nejat Yücel, Gülay Yılankaya-Erdoğu, Onur Özbek, Ozan Özbudak, Heval Bozbay, Gülgün Gürcan, Nuray Kaygaz, Melek Kuş, Sedef Polatcan, Ramazan Gündüz, Abdurrahman Sönmez, Erkan Gürçal and Funda Değer for all the work they have done in 6 years.

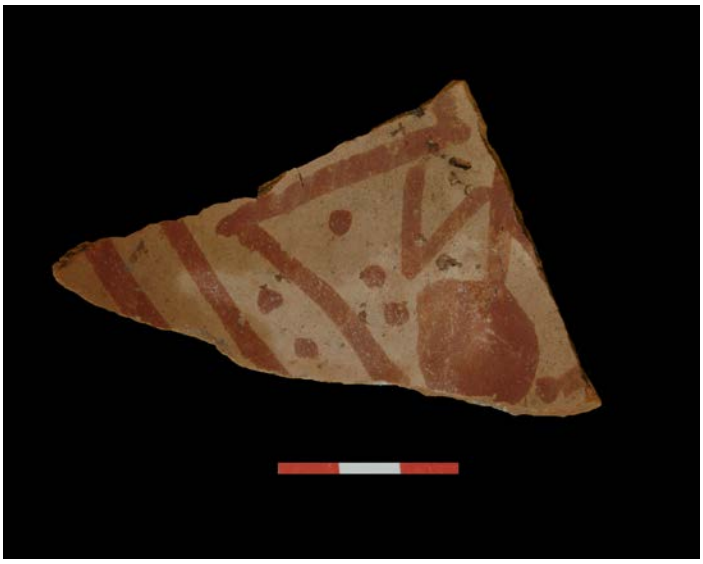

Figure 6.3. A sherd with a human figure

Figure 6.4. Space 481 with buttresses

7. Report on the Geophysical Survey at Çatalhöyük 10th – 20th July 2012

Stefano Campana, Gianluca Catanzariti, Gianfranco Morelli, Jessica Ogden, Kristian Strutt

Between the 10th and 20th July 2012 a geophysical survey was conducted at Çatalhöyük in the region of Çumra by a joint British and Italian team from the University of Southampton, UK, the University of Sienna, Italy and Geostudi Astier, Italy. The work formed a second season of geophysical survey at the site, following the work undertaken by a team from the University of Southampton in June 2010.

The aim of the geophysical survey was to map the nature and extent of buried archaeological features across the East Mound of Çatalhöyük. The 2012 survey continued this work, and in addition a trial area of survey was conducted in fields to the south-west of the main site, to test the application of survey techniques in the environs of Çatalhöyük, especially in relation to locating varying deposits from geomorphological change around the mound. In 2012 topographic survey was conducted using differential GPS instruments, the 2010 magnetometer survey was extended on the East Mound and in the environs of the site, and the 2010 single antenna GPR was also extended, under the direction of Kristian Strutt from the Department of Archaeology at the University of Southampton (http://www.southampton.ac.uk/archaeology;http://www.southampton.ac.uk/archaeology/apss/). A rapid multiple antenna radar system was also applied at the site, under the direction of Stefano Campana and Gianfranco Morelli, in the form of STREAM X instrumentation, with the aim to test the technique over a large area of the site, a system used regularly by Gianfranco Morelli of Geostudi Astier (http://www.geoastier.com/index.php?lang=en) and the Laboratory of Landscape Archaeology and Remote Sensing of the University of Siena leaded from Stefano Campana (http://www.lapetlab.it/indexE.html).

Survey Methodology

The GPS and Topographic Survey

Figure 7.1. The Leica Viva GPS base station set up on the east mound.

The GPS survey was conducted using a Leica GS10 Viva base station with GS15 Viva rover. A base station was established over the principal trig. point on the east mound (Figure 7.1) and was used throughout the survey as a reference point. The GPS worked in WGS 1984 and UTM 36N systems. A series of measurements were then recorded on the permanent stations of the excavation grid, and a transformation was generated between the local excavation grid and the UTM geographic coordinate system, tying the local grid in to world coordinates. To date no post-processing of the GPS data has been conducted, so all UTM coordinates that have been produced would benefit from additional absolute accuracy using RINEX data.

The GPS was used to re-establish the geophysical survey grid from 2010, and position pegs on a 30m by 30m grid. For the survey work off the mound grids were set out on the UTM eastings and northings at 30m intervals. The GPS was also used to

conduct a trial topographic survey off the mound, as part of the survey investigating potential palaeo-channels to the south and south-west of the mound.

The Magnetometer Survey

Figure 7.2. Magnetometer survey being conducted using a Bartington Instruments Grad 601 dual sensor fluxgate gradiometer.

The magnetometer survey was conducted using a Bartington Instruments Grad601-2 dual sensor fluxgate gradiometer (Figure 7.2). Data were collected along traverses spaced 0.5m apart at 0.25m intervals.

The magnetometer survey data were imported into and processed using Geoplot 3.0 software. The processing of data was necessary to remove any effects produced by changes in the earth's magnetic field during the course of survey, and to minimise any interference in the data from surface scatters of modern ferrous material and ceramics. Data were despiked to remove any large peaks or 'spikes' from the data produced by material on the surface of the field. A mean traverse function was then applied to average out any changes in the data produced by the 'drift' in the earth's magnetic field. Filters were subsequently applied to smooth out any high frequency, small disturbances in the data. Finally 0.5m values were interpolated from the existing readings to improve the spatial resolution of the results across the traverse lines.

The STREAM X GPR Survey

The new Subsurface Tomographic Radar Equipment for Assets Mapping (STREAM) was developed initially for pipe detection (Simi et al., 2010). The STREAM system is very scalable because it can drive one to four antenna units at the same time. Hence it can cover a swath width from 0.84m to 3.72m in a single pass. The former is most suited for confined areas in buildings and the latter for covering extremely large areas in the shortest possible time. A simpler module designed for archaeological prospection is presented in this work. The so-called STREAM X system for large-scale archaeological prospection (Novo et al., 2011; Novo et al. 2012) comprises a vehicle-towed trolley that transports a 1.68m wide GPR massive array. The 'black box' (comprising two modules) contains 16 dipoles oriented parallel with respect to the forward direction (vertical polarization), with a spacing of 12cm and working at the frequency of 200MHz. STREAM X data acquisition is driven by a control unit that guarantees high acquisition speed (1450 scans s-1 at 512 sample per trace). The system can be driven up to 15 km/h.

Figure 7.3. The STREAM X GPR survey being conducted, using a tractor for pulling the system.

Previous applications to archaeological contexts and their results highlight the effectiveness and robustness of the method for large-scale archaeological investigations

(Figure 7.3). The results of the survey could present a great benefit for the project, providing very high-resolution data for sub-surface structures in a very short time. This in term will help improve the general understanding of the site and better planning of future excavation areas. In addition the interpretation of high resolution GPR dataset could allow the implementation of virtual models, communicating more widely and effectively the extraordinary character and potential of the site (Campana, Piro, 2009).

The main difficulties at Çatalhöyük for the implementation of the STREAM X system should be recognized in the low contrast between the natural background and the remains of past structures (basically clay on clay), and the bumpiness and the dirtiness (remains of vegetation cut on the top soil) of the survey area.

Bearing in mind the large number of archaeological sites with the same kind of subsurface structures, consisting mainly of mud brick and wall plaster, the application of this technique could represent a key challenge to improve the detectability of important cultural remains across a large part of Asia.

The acquisition was carried out by mounting the array behind a tractor vehicle. The unavailability of a quad vehicle forced the team to modify the equipment for a Kubota tractor, introducing some limitation in the stability and the efficiency of the data collection system. In addition data quality and speed of data collection was strongly influenced from the uneven ground conditions and the presence on the surface of remains of cut grass and vegetation. A 1-ha survey was surveyed in about 120 minutes using a zig-zag mode of data acquisition. Data collection was carried out by one operator thanks to the *Snail'Nav* navigation software running on a field computer. The survey area of 3.4 ha was covered over 3 days of fieldwork.

The STREAMX is towed by a vehicle allowing in theory all parts of the site to be accessed. Real-time kinematic (RTK) GPS or robotic total station systems can be interfaced with acquisition software to mark system trajectory in order to correctly position data on the XY plane during the following analysis stage. The system records with a spacing of 12cm and 6 cm in cross-line and in-line directions. Therefore it is required that the positioning is precise to about 2 cm to be adequate for the high resolution of the GPR system. The STREAM X has an interface to these positioning devices and allows recording of the surveyed track. These data are processed and used for precise coordinate determination of each trace and for time to depth-slice calculation. Obviously data collection has to follow some basic principles; adjacent swaths have to partially overlap in order not to leave any gaps and to assure proper mapping of features situated on the edge of adjacent swaths. Trajectories have to be as straight as possible, avoiding any twisting of the antenna configuration.

The system also uses a computer-navigation guided system to correctly follow profile direction and keep a constant overlap among profiles without any physical marker on the ground surface, minimising topographical or survey preparation in the field before the GPR survey. If the overlap between the swaths is too large some efficiency gained by the massive array of antennae is lost. Definition of trajectories is a way of coping with these problems. Hence a navigation system has to guide the driver so as to maintain a defined overlap, just large enough to cover normal deviations from the desired trajectories. For such purposes, a specific GIS-based software, called Snail'Nav, has been developed by Geocarta for IDS. This software runs parallel to the radar data acquisition software and provides a graphic interface so the operator can see their navigation on

the screen of the laptop in real time. Such a solution makes it possible for a single operator to perform the GPR survey without needing extra help.

In this particular case, the STREAM X data were located using a RTK-GPS with differential correction using a radio-link from base to rover. The topographic survey was conducted by the University of Southampton using a Leica GS10 Viva base station with GS15 Viva rover. Use of the GPS to locate the survey grids and topography into UTM 36N, and the use of the GPS with the STREAM X GPR, means that all of the 2012 survey data has been georeferenced into a single geographic coordinate system. This has also facilitated comparison of the air photographic and cadastral map data in a GIS in a common coordinate system.

The Single Antenna GPR Survey

In addition to the STREAM X survey the single antenna GPR survey of 2010 was also continued in the vicinity of the north shelter. The survey was conducted using a Sensors and Software instrument with Smart Cart, and a 500 mHz antenna. Traverses were surveyed in zig-zag fashion at 0.5m intervals across the survey area, with trace measurements taken at 0.025m intervals. Data were processed in GPR-Slice software and a series of time-slice plans were produced for results at different depths.

All data from both single antenna and STREAM X systems were processed using GPR Slice software. The different survey profiles were presented in their relative positions, and all profiles were then processed to remove background noise. A bandpass filter was applied to each profile to remove all high and low frequency readings. The presence of hyperbola in the data were utilised to produce an estimation of signal velocity through the deposits at each site, facilitating a calculation of the depth of different features across each site. Profiles were then converted into grid data and were sliced horizontally to produce a series of timeslices through each survey area.

The Survey Results

The Topographic Survey

The 2012 topographic survey was conducted in the area to the south-west of Çatalhöyük. In addition the original 1995 and 1996 topographic data (Figure 7.4) was imported into the GIS and UTM 36N, for use with the GPR survey data.

The topographic layout of the east mound is relatively well known and there is no need to expand on it here. The topographic survey off mound (Figures 7.5 and 7.6) indicated a number of interesting features that relate to the geophysical survey results. Firstly the entire central and western part of the survey is covered with a rippling effect, with each band measuring 11-12m across, suggesting the effect on the modern ploughsoil through strong winds. The fall and slight rise in the topographic data in the eastern side of the fields, original thought to relate to a palaeo-channel and geoarchaeological features, seems to be formed entirely from later agricultural activity, with the rise matching the line of a field boundary visible in the 1940s air photography. This is a significant aspect of the landscape, as many of the features visible on the modern ground surface may not actually relate to prehistoric or Byzantine archaeology, but to more recent aspects of agriculture and soil formation.

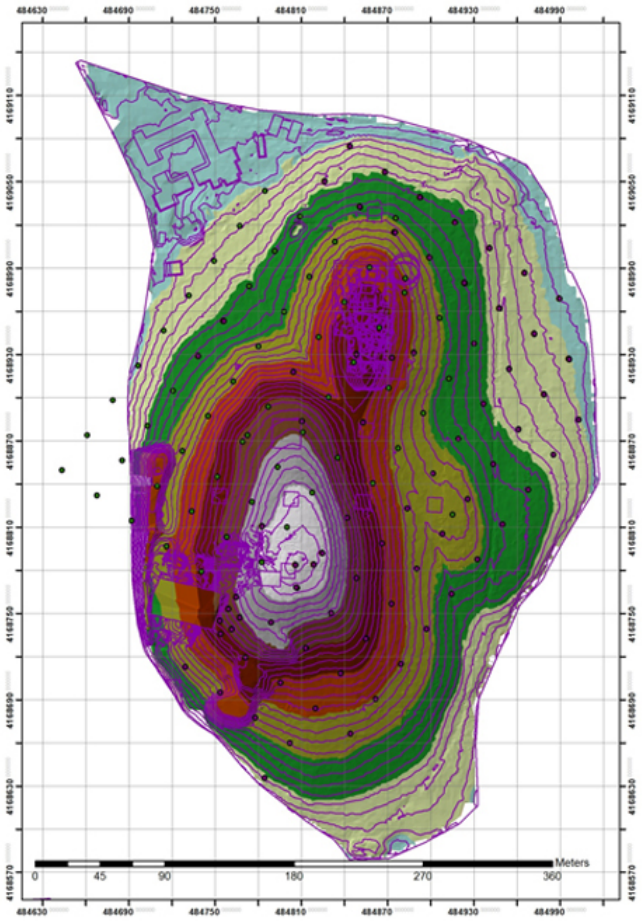

Figure 7.6. The topographic survey of the east mound, transformed into UTM 36N.

Figure 7.5. The east mound in relation to the topographic survey conducted in 2012 in UTM 36N.

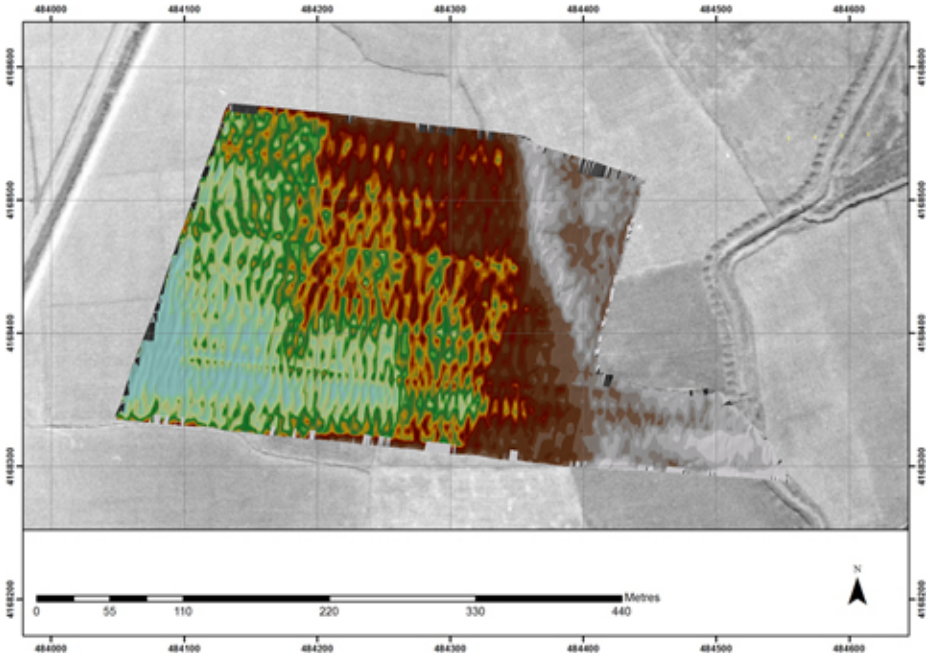

Figure 7.4. The results of the topographic survey in the fields to the south-west of the mounds.

The Magnetometer Survey

Approximatelt 7.5 hectares of magnetometry were conducted at Çatalhöyük on the East Mound, with a further one hectare of survey carried out on the plain to the south-west of the site (Figures 7.7 and 7.8).

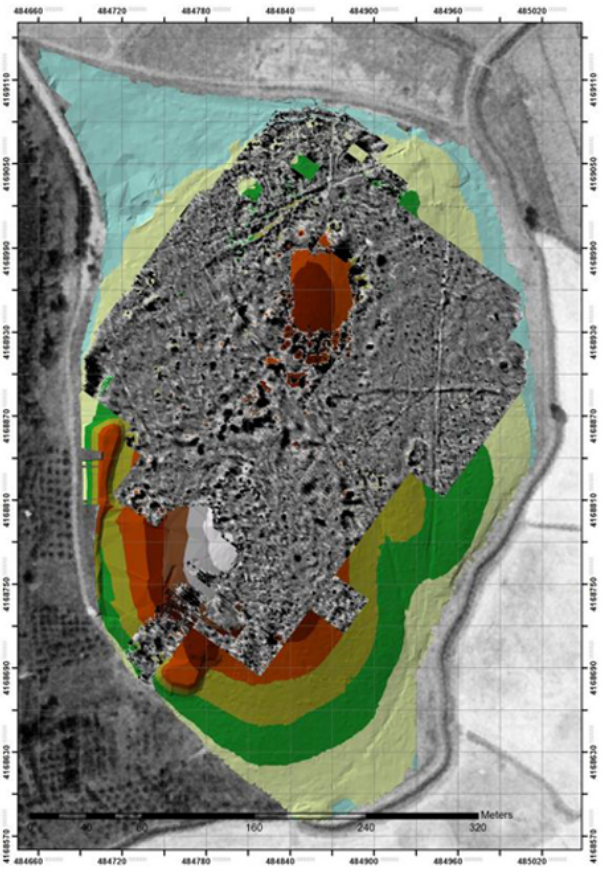

Figure 7.8. The results of the magnetometer survey for the east mound overlaid onto the topographic survey.

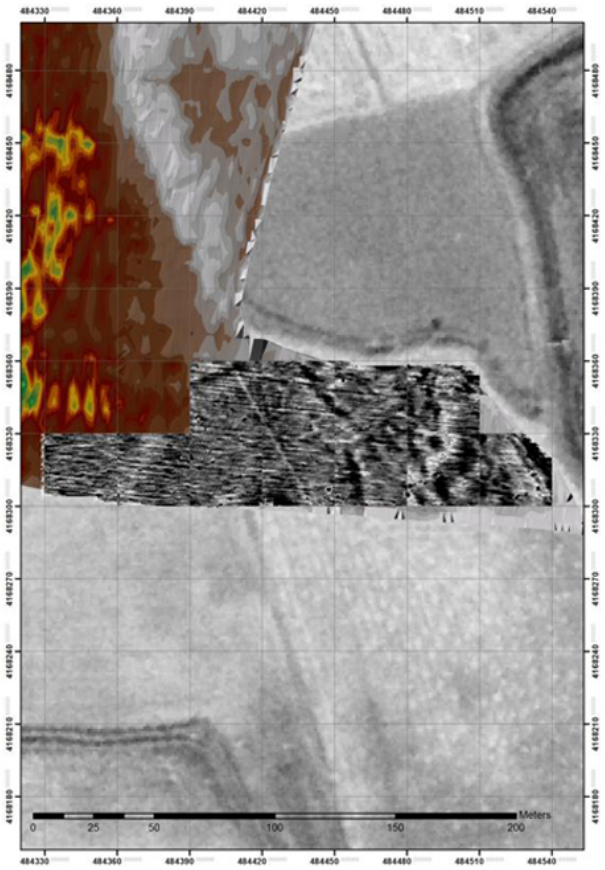

Figure 7.8. The results of the magnetometer survey in the fields overlaid onto the topographic survey.

The East Mound

On the north mound a number of strong dipolar anomalies **[m1.1]**, **[m1.2]**, **[m1.3]**, **[m1.4]**, **[m1.5]** and **[m1.6]** alongside the southern and eastern edge of the north shelter (Figures 7.9 and 7.10) mark remnants of iron rebar and other ferrous material associated with excavation at the site.

A large number of anomalies appear in the magnetometry in the northern sector of the East Mound, indicating the remains of structures across the mound. Immediately to the west of the north shelter a series of linear and curvilinear anomalies mark a structure measuring some 8m by 3m **[m1.7]** with a second structure **[m1.8]** and third structure **[m1.9]** to the north. A strong dipolar anomaly **[m1.10]** marks remnants of an iron rebar which occludes some of the fainter features, although a rectilinear anomaly **[m1.11]** measuring 7m by 4m is visible, and a series of negative linear anomalies **[m1.12]** mark walls buried in strongly magnetic sediment. A strong positive linear anomaly **[m1.13]** marks a wall running north-south for a distance of 10m. A strong linear anomaly to the west and north **[m1.14]** marks a strong edge of the structures present along the north side of the north shelter.

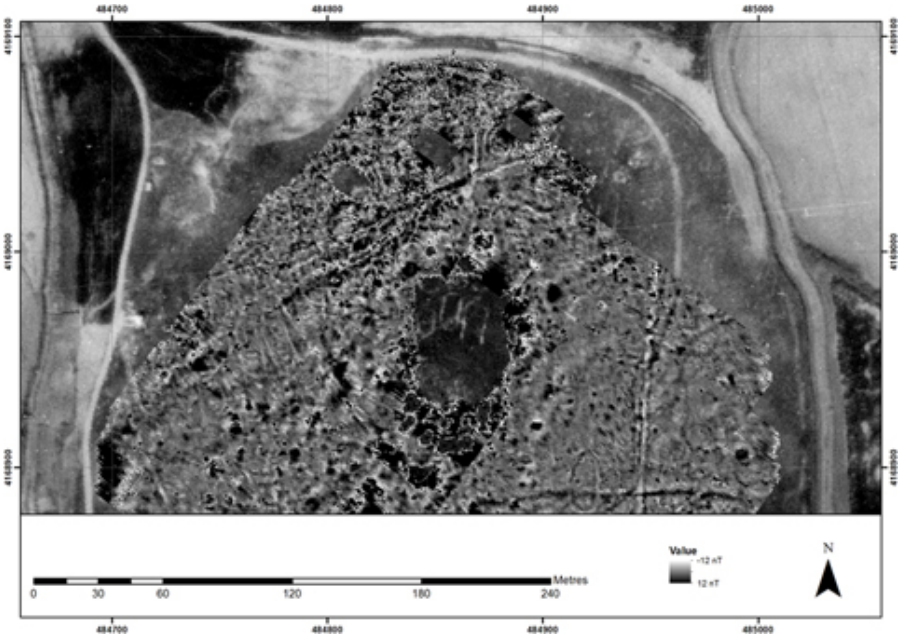

Figure 7.10. Greyscale image of the results of the magnetometer survey for the north part of the east mound.

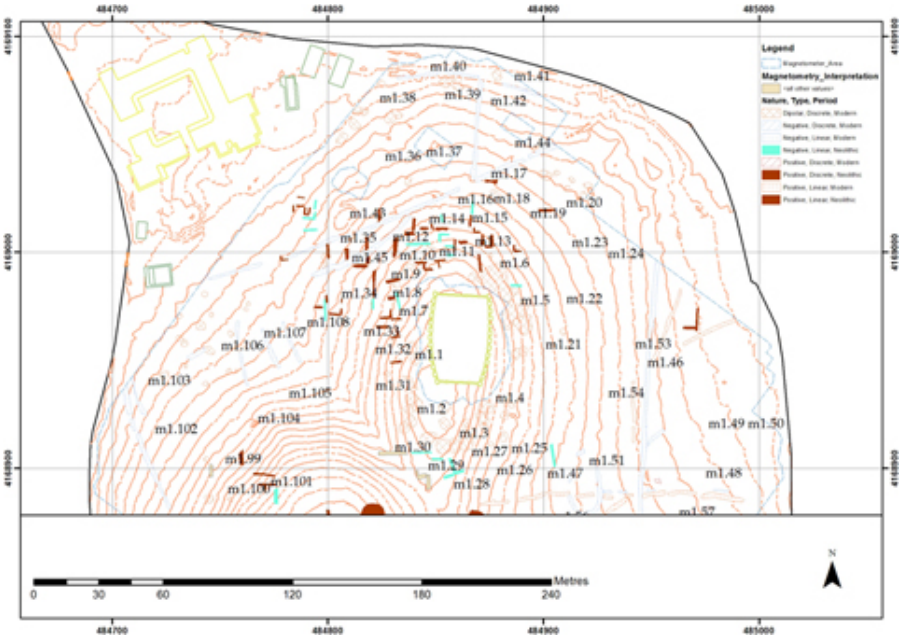

Figure 7.9. Interpretation plot derived from the magnetometer survey for the north part of the east mound.

A linear positive anomaly **[m1.15]** some 7m long, and a continuation of this to the north as a negative anomaly **[m1.16]** suggest the line of a wall, associated with several discrete positive anomalies, and a positive linear return **[m1.17]** to the north. A series of discrete positive **[m1.18]** and linear **[m1.19]** to the east suggest a continuation of building remains in this area of the mound. A return of these features **[m1.20]**, showing negative deposits and a possible positive wall, runs from north to south. The zone to the east of the north shelter has been affected by modern ferrous material, however a series of linear and rectilinear **[m1.21]** and discrete positive anomalies **[m1.22]** indicate the presence of buried structures on the higher eastern edge of the mound. Some linear positive anomalies to the north-east **[m1.23]** measuring some 15m in length seems to indicate the presence of structures further down the flanks of the mound, although some modern disturbance **[m1.24]** is also visible.

The area to the south-east of the north shelter does not show any strong linear anomalies. Several positive discrete anomalies, **[m1.25]** and **[m1.26]**, on linear alignments spreading west to east, suggest possible midden or dumped deposits. Very faint negative readings over the area may indicate possible structural remains, but this is difficult to determine. A large area of the survey results are saturated **[m1.27]** as a result of interference from the north shelter. However several negative linear anomalies **[m1.28]** and **[m1.29]** measuring some 10m in length, and a large dipolar linear anomaly indicate the presence of buried structures. A negative and positive

linear anomaly **[m1.29]** and **[m1.30]** runs from west to east across the site, again indicating the presence of a buried wall. Dipolar linear **[m1.31]** and several positive linear anomalies **[m1.32]** and **[m1.33]** extend westward from the edge of the north shelter, for a distance of 15-16m, indicating the presence of structures to the west of the excavations.

A positive rectilinear anomaly **[m1.34]** measuring 10m by 7m indicates a structure to the west, and two positive rectilinear anomalies **[m1.35]**, adjacent to one another also suggests similar structural remains. A number of linear and rectilinear positive anomalies **[m1.36]** and **[m1.37]** close to the excavation house, suggesting possible structures, some 9m by 6m in size. These features seem to continue to the north **[m1.38]**, and some fainter disturbance is visible to the east **[m1.39]**. A negative linear anomaly **[m1.40]** and **[m1.41]** runs for a distance of 75m marks a possible shallow ditch running around the outer flank of the mound, with a perpendicular negative linear anomaly **[m1.42]** running from north to south for a distance of 45m.

A longer negative linear anomaly **[m1.43]** and **[m1.44]** runs from south-west to north-east marking a second more substantial ditch feature. A further smaller ditch **[m1.45]** is also visible running to the south of **[m1.43]**, at a slight tangent.

On the eastern flanks of the mound a negative linear anomaly **[m1.46]** runs from north to south, marking a field boundary ditch. A second ditch and bank **[m1.47]** crosses the mound from west to east running off the eastern flank of the mound **[m1.48]** covering a distance of 126m. Several ovate and sub-circular anomalies are visible along the edge of the survey area **[m1.49]** and **[m1.50]** marking possible threshing floors associated with modern agriculture. Two further threshing floors are visible further to the west **[m1.51]** and **[m1.52]**. Two positive linear anomalies **[m1.53]** and **[m1.54]** cut across the mound flank to the north. To the south several discrete positive and negative anomalies **[m1.55]** and **[m1.56]** mark possible modern burials on the flank of the mound, however these anomalies **[m1.57]** and **[m1.58]** are especially obvious further to the east. A positive linear anomaly **[m1.59]** cuts across the mound from north-east to south-west for a distance of 53m. A number of positive linear and discrete anomalies **[m1.60]**, **[m1.61]** and **[m1.62]** mark faint traces of structural remains on the eastern side of the mound. These seem to run towards the edge of the survey area **[m1.63]**, **[m1.64]** and **[m1.65]** including some rectilinear features measuring up to 14m by 10m in size. These also include some strong discrete responses suggesting possible dumped or midden material.

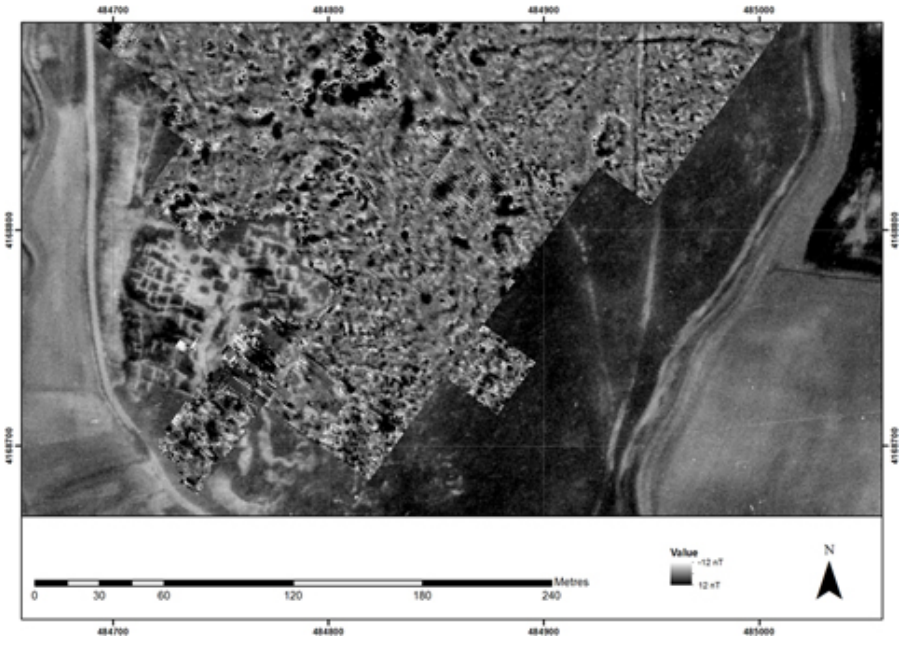

Figure 7.11. Greyscale image of the results of the magnetometer survey for the south part of the east mound.

On the principal heights of the East Mound, to the east of the south shelter, a strong pattern of linear and discrete anomalies marks a concentration of settlement in the area. Two strong linear anomalies **[m1.67]** and **[m1.68]** are visible, with a large open area **[m1.69]** measuring 25m by 10m,

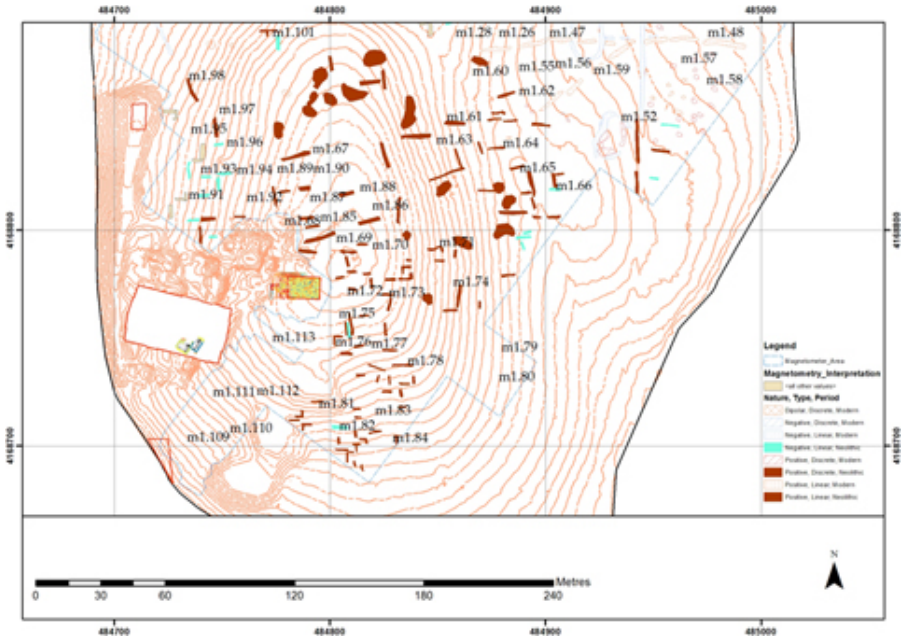

Figure 7.12. Interpretation plot derived from the magnetometer survey for the south part of the east mound.

marked with discrete anomalies suggestive of fired material. To the south a second large rectilinear anomaly **[m1.70]** measuring 25m by 10m and a series of linear positive anomalies **[m1.71]** are visible. A series of smaller linear and rectilinear anomalies are located to the south **[m1.72]**, **[m1.73]** and **[m1.74]** indicate houses.

Three sets of linear positive anomalies **[m1.75]**, **[m1.76]** and **[m1.77]**, the first running from north to south, and the second two from west to east (Figures 7.11 and 7.12), mark a building measuring some 13m by 10m in size. A further rectilinear anomaly is located to the south **[m1.78]** measuring 10m by 6m. To the east, and on the flank of the mound a set of positive magnetic responses **[m1.79]** and **[m1.80]** run from south-west to north-east, suggesting a change of alignment in the structures along this side of the mound. To the south and west of the high ground a large number of linear and rectilinear anomalies **[g1.81]**, **[m1.82]**, **[m1.83]** and **[m1.84]** show buildings extending down the side of the mound in a north to south orientation.

A series of positive linear magnetic anomalies **[m1.85]**, **[m1.86]**, **[m1.87]** and **[m1.88]** extend from west to east across the highest point of the east mound, showing the presence of buildings. Two orthogonal linear anomalies **[m1.89]** and a linear anomaly **[m1.90]** also indicate structures which extend westwards to the north of the south shelter as a series of positive and negative linear anomalies **[m1.91]** and **[m1.92]** marking buildings. Of note are the number of negative linear anomalies **[m1.93]** and **[m1.94]** suggesting mud-brick structure surrounded by material with a higher magnetic susceptibility. These remains extend further to the north **[m1.95]**, **[m1.96]** and **[m1.97]** showing the continuation of the buildings located in the excavations at the south shelter. The pattern of linear anomalies extends along the western and north western side of the mound **[m1.98]** – **[m1.101]**. Two negative linear anomalies **[m1.102]** and **[m1.103]** mark modern ditches running from south to north across the western side of the mound. A series of discrete positive and dipolar anomalies **[m1.104]** and **[m1.105]** on the side of the mound show the presence of structures or midden features. Several negative linear anomalies **[m1.106]**, **[m1.107]** and **[m1.108]** mark possible modern agricultural features running down the side of the mound.

In the southernmost area of the magnetometer survey, results were affected by the presence of the south shelter. However several linear and discrete anomalies **[m1.109]** and **[m1.110]** mark the presence of buildings and midden deposits. A strong rectilinear response **[m1.111]** and **[m1.112]** measuring some 15m across also indicates structural remains, together with strong positive responses immediately to the east of the shelter **[m1.113]**.

The Open Fields

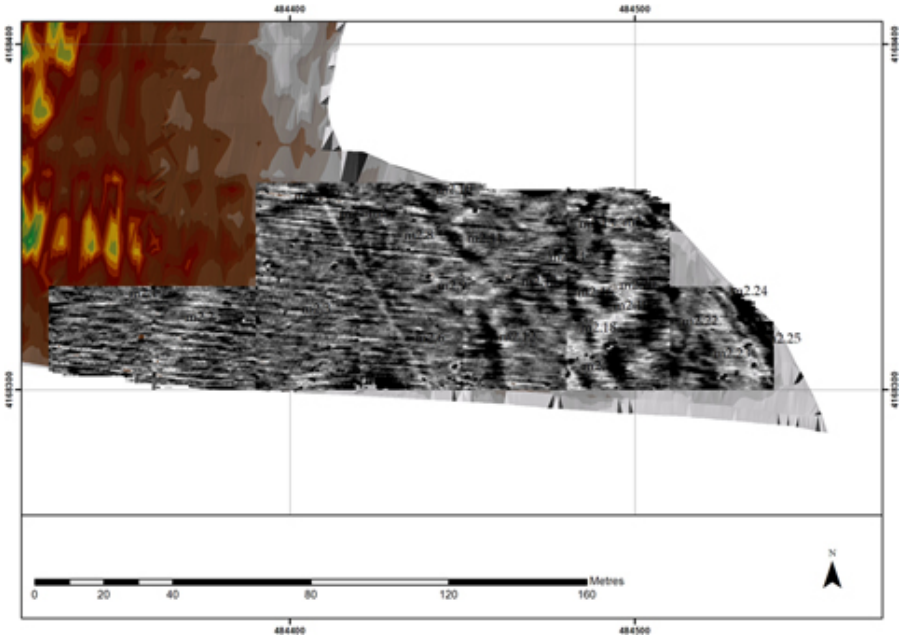

Figure 7.14. Greyscale image of the results of the magnetometer survey for the fields to the south-west of the mounds.

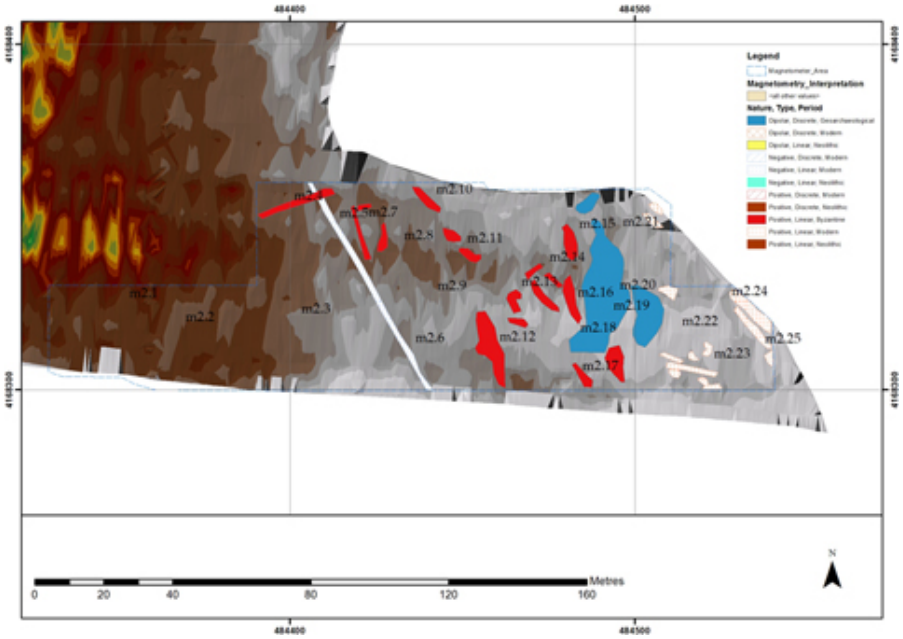

Figure 7.13. Interpretation plot derived from the magnetometer survey for the fields to the south-west of the mounds.

The western part of the survey area **[m2.1]** and **[m2.2]** indicates a series of parallel faint anomalies (Figures 7.13 and 7.14), marking evidence of modern ploughing which extends across the survey area **[m2.3]**. A positive linear anomaly **[m2.4]** indicates the remains either of a wall or possible field boundary., with a second longer negative anomaly **[m2.5]** and **[m2.6]** measuring 70m in length marking the line of a pipe or drainage feature. A rectilinear **[m2.7]** and linear **[m2.8]** positive anomaly marks possible structural remains in the centre of the area. A faint area of negative readings **[m2.9]** is visible to the west of a line of short positive anomalies **[m2.10]**, **[m2.11]** and **[m2.12]**, suggesting dumped building material. A rectilinear positive anomaly **[m2.13]** measuring 14m by 6m marks possible structural remains.

A double line of positive discrete anomalies **[m2.14]** and **[m2.15]**, which appear to be associated with a negative band of readings **[m2.16]**, **[m2.17]** and **[m2.18]** suggests varying soil types, possibly associated with a channel or area of differing drift geology. These strong readings spread further to the east **[m2.19]** and **[m2.20]** covering and area measuring some 20m across. Several strong discrete anomalies **[m2.21]** suggest dumped building material to the east, with a quiet band of readings **[m2.22]** further to the east, a linear positive anomaly **[m2.23]** and a band of strong positive readings **[m2.24]** and **[m2.25]** marking material associated with the modern field boundary.

The STREAM GPR Survey

At the shallowest level of data (Figures 7.15-7.19) (0.3-0.5m) a number of anomalies appear in the STREAM GPR. Around the north shelter a double linear high amplitude anomaly **[SN1.1]** and **[SN1.2]** measuring 18m in length marks the sides of structures and a possible trackway or route between them. To the east of these two linear high amplitude responses mark structural remains **[SN1.3]**, whereas a set of curvilinear low amplitude features **[SN1.4]** mark the remains of modern threshing floors. A series of linear and rectilinear anomalies on the north east side of the mound **[SN1.5]** indicates buildings, with a series of similar responses **[SN1.6]**, **[SN1.7]**, **[SN1.8]** and **[SN1.9]** seem to indicate buildings and a strong edge to the structures located at the base of the steeper topography along the eastern side of the mound. These linear anomalies extend to the southern edge of the survey area **[SN1.10]**.

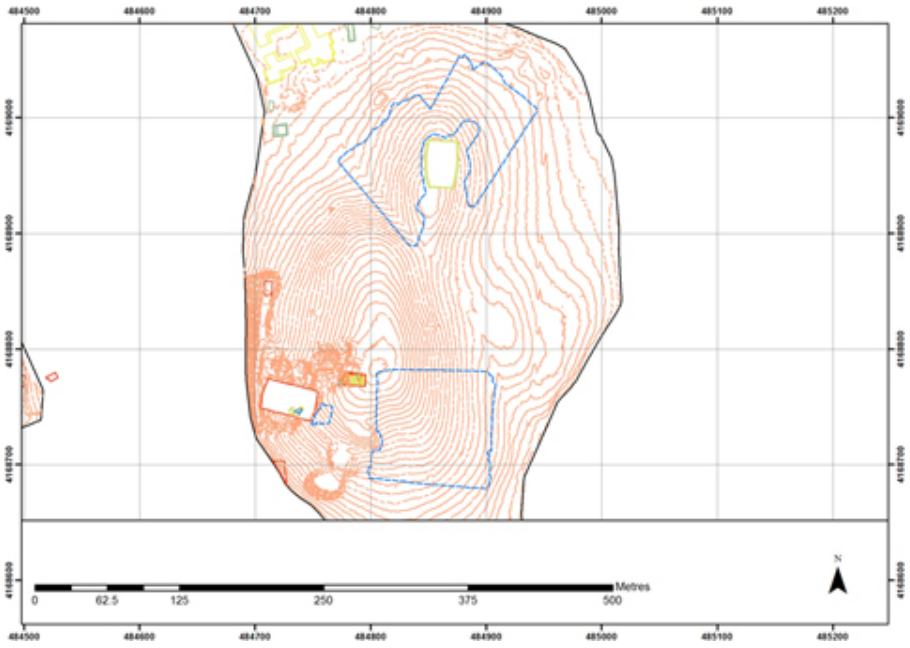

Figure 7.15. Location of the STREAM GPR survey areas on the east mound.

Along the northern side of the STREAN results the presence of linear and rectilinear anomalies **[SN1.11]**, **[SN1.12]** and **[SN1.13]** indicate buildings on the northern flanks of the mound. Strong linear high amplitude anomalies extend to the east **[SN1.14]**, **[SN1.15]** and **[SN1.16]** suggesting the continuation of structures in this area, although the response is less clear further to the east. Similar anomalies are located on the flanks of the mound to the east **[SN1.17]**, **[SN1.18]** and **[SN1.19]** showing buildings measuring between 7m and 10m across. Several low amplitude responses **[SN1.20]** indicate further threshing floors, with high amplitude linear anomalies **[SN1.21]** and **[SN1.22]** showing structures further to the south.

To the north-west of the shelter a series of high amplitude anomalies **[SN1.23]** and **[SN1.24]** extending westward **[SN1.25]**. Two parallel and large linear low amplitude anomalies **[SN1.26]** and **[SN1.27]** run for a distance of over 32m, marking possible track-ways or routes between buildings. Along the western side of the shelter a series of linear anomalies **[SN1.28]** – **[SN1.31]** mark buildings extending from the excavations under the shelter. These extend faintly to the south **[SN1.32]**. A number of faint linear anomalies are also visible to the west **[SN1.33]** and **[SN1.34]** marking faint remains of buildings.

In the area to the east of the south shelter a strong trend of anomalies seems to be in a west to east direction. In the north-west corner of the survey area several linear anomalies **[SS1.1]** run from west to east for a distance of over 14m, marking the presence of buildings. These are matched by linear anomalies **[SS1.2]** and **[SS1.4]** running from north-south and a rectilinear anomaly **[SS1.3]** measuring 9m by 6m indicating the presence of a building. Several shorter linear anomalies **[SS1.5]** and **[SS1.6]** show the presence of walls to the south. A linear anomaly

[SS1.7] and a second similar anomaly to the south **[SS1.8]** indicate a wall or pair of walls running from north to south. Several short high amplitude anomalies **[SS1.9]** and **[SS1.10]** indicate the possible presence of buildings to the south, although these are not very clear.

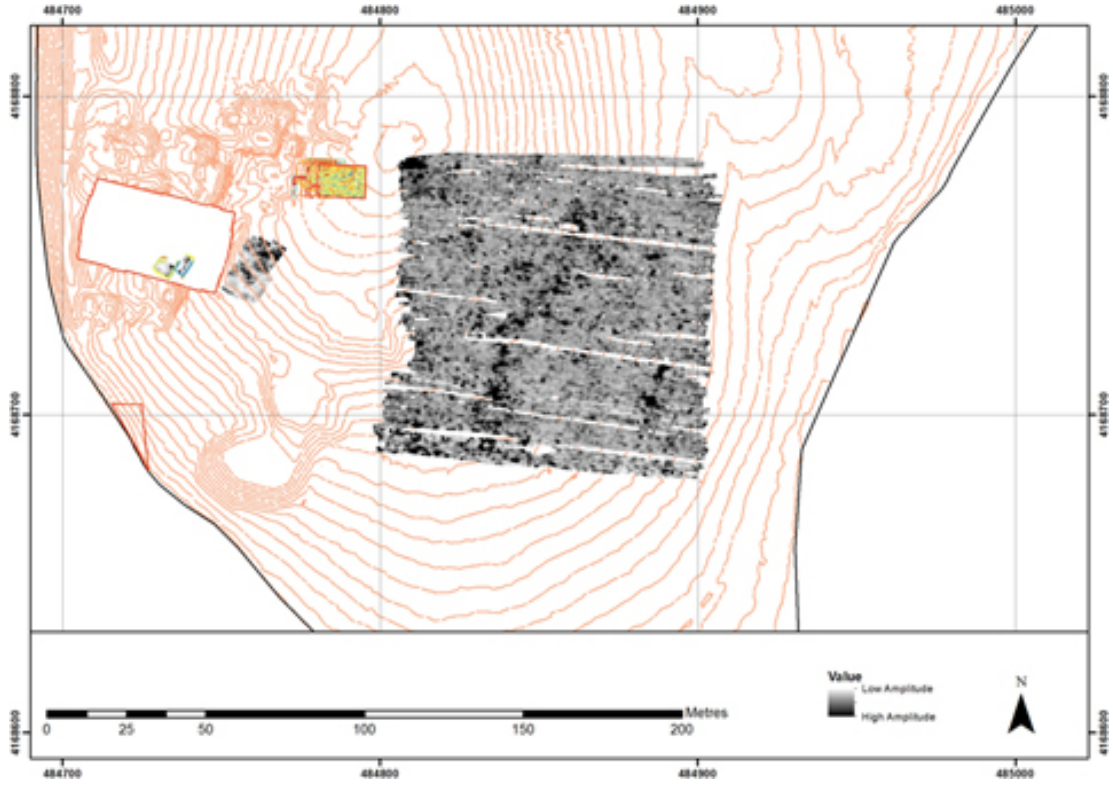

Figure 7.16. Greyscale of the STREAM results for the south part of the east mound at 0.3-0.5m depth.

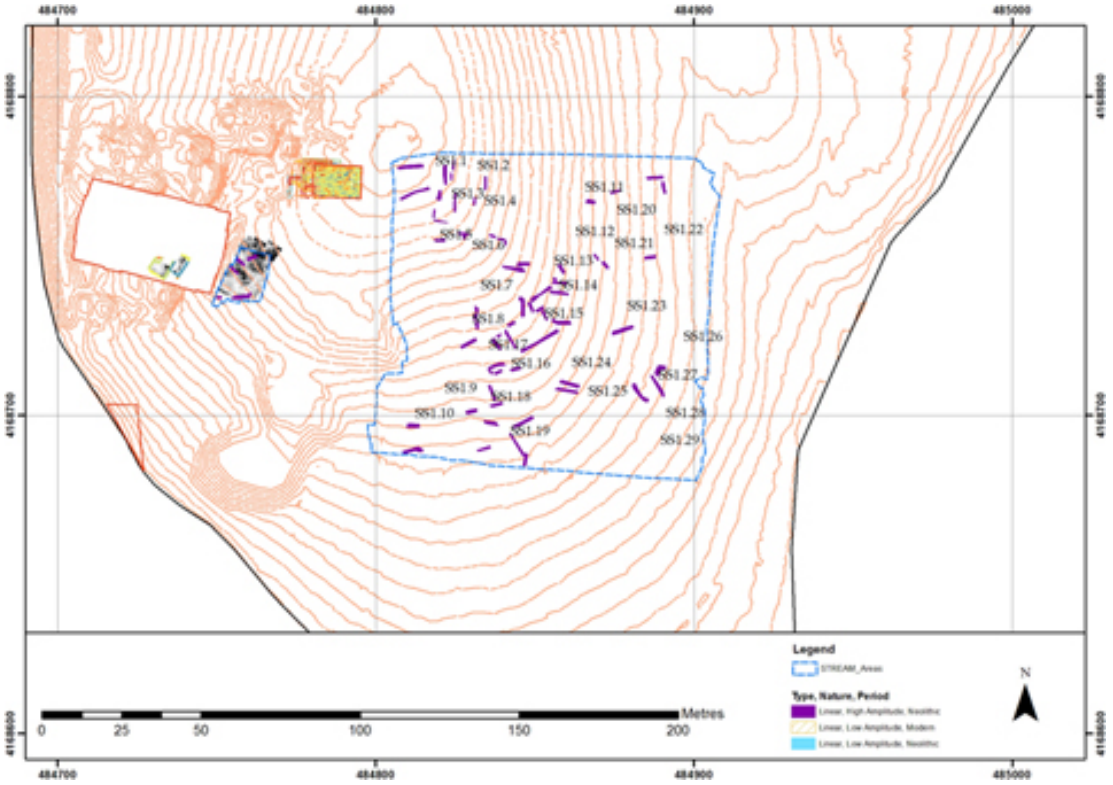

Figure 7.17. Interpretation plot derived from the STREAM results for the south part of the east mound at 0.3-0.5m depth.

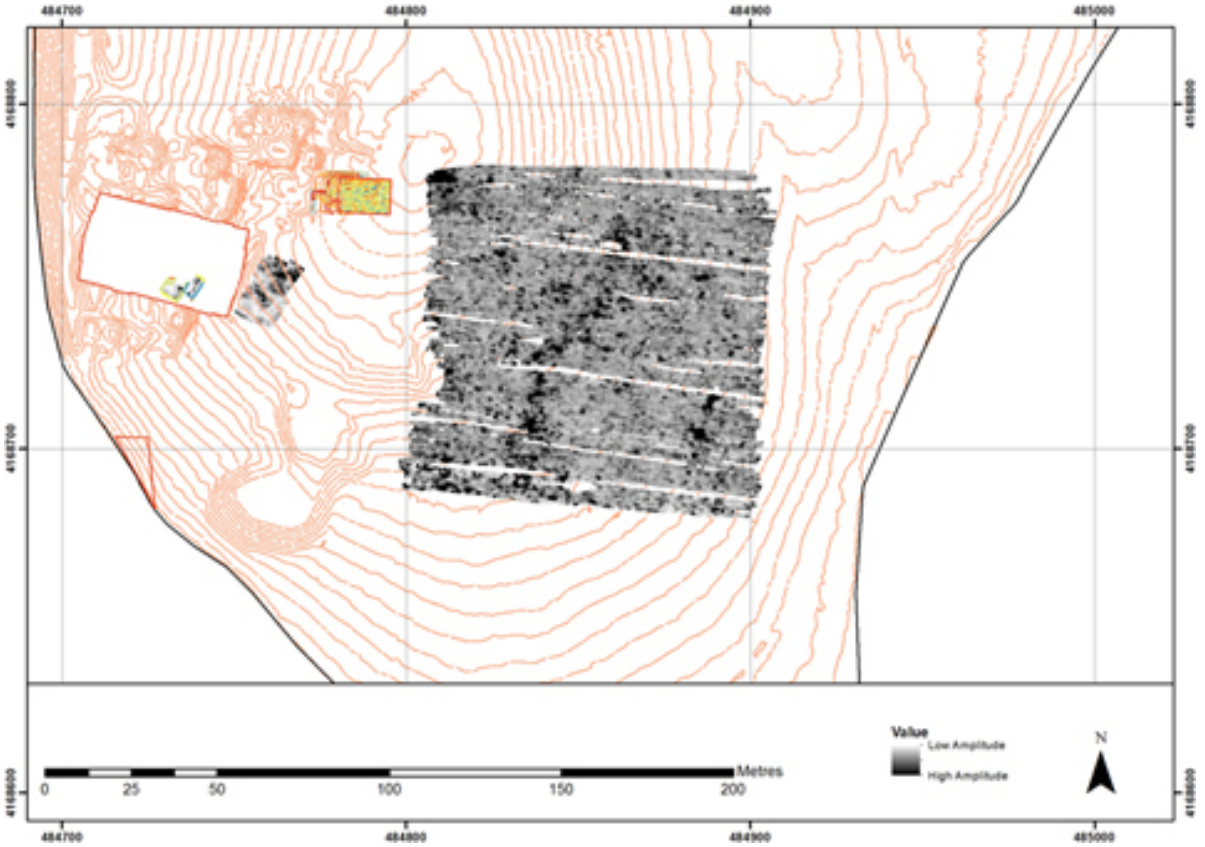

Figure 7.19. Greyscale of the STREAM results for the south part of the east mound at 0.3-0.5m depth.

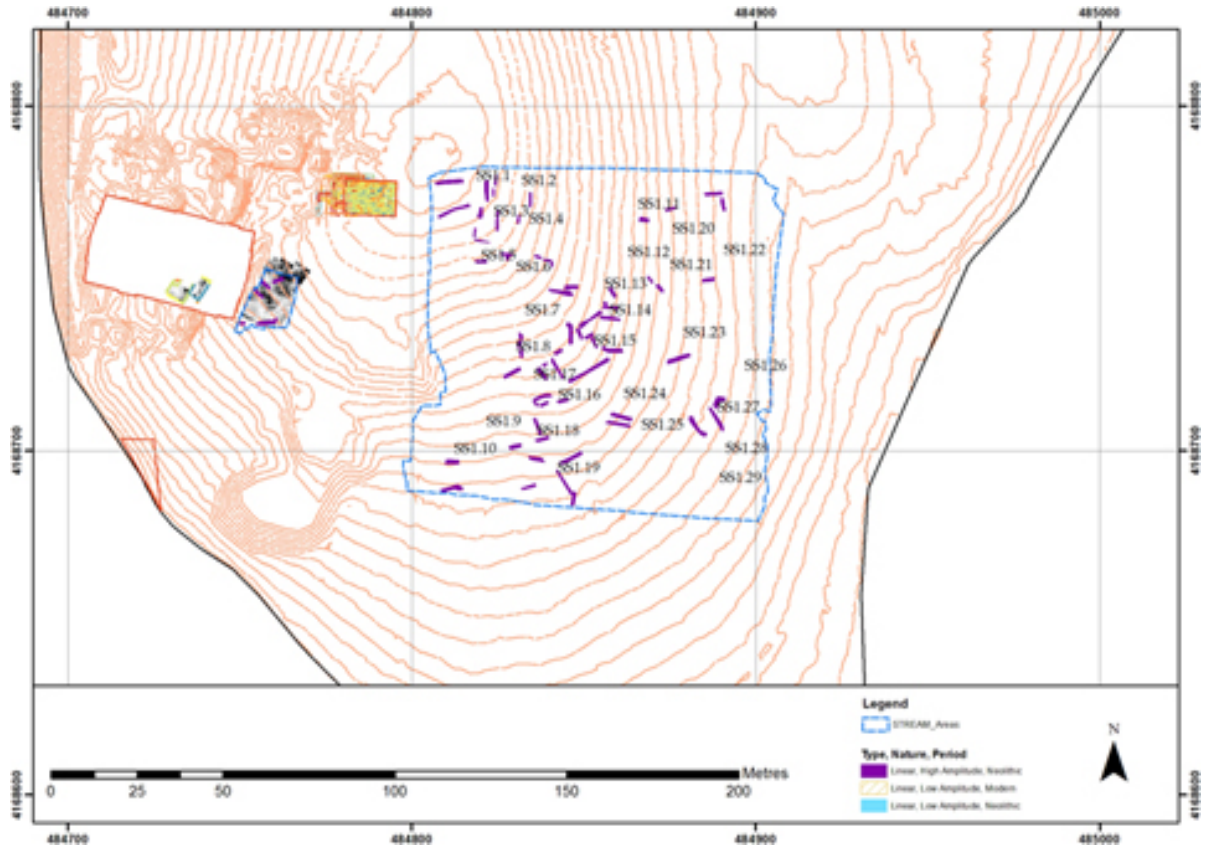

Figure 7.18. Interpretation plot derived from the STREAM results for the south part of the east mound at 0.3-0.5m depth.

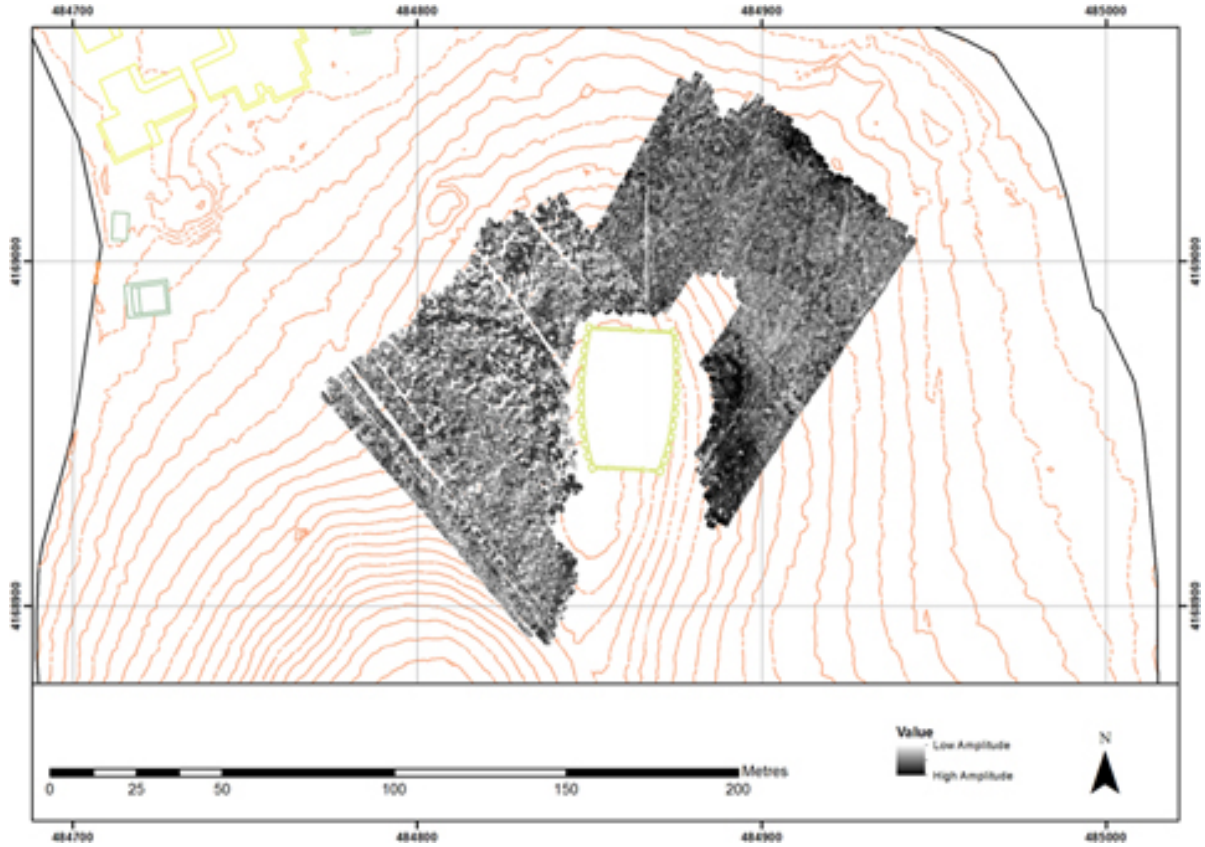

Figure 7.20. Greyscale of the STREAM results for the north part of the east mound at 1.0-1.25m depth.

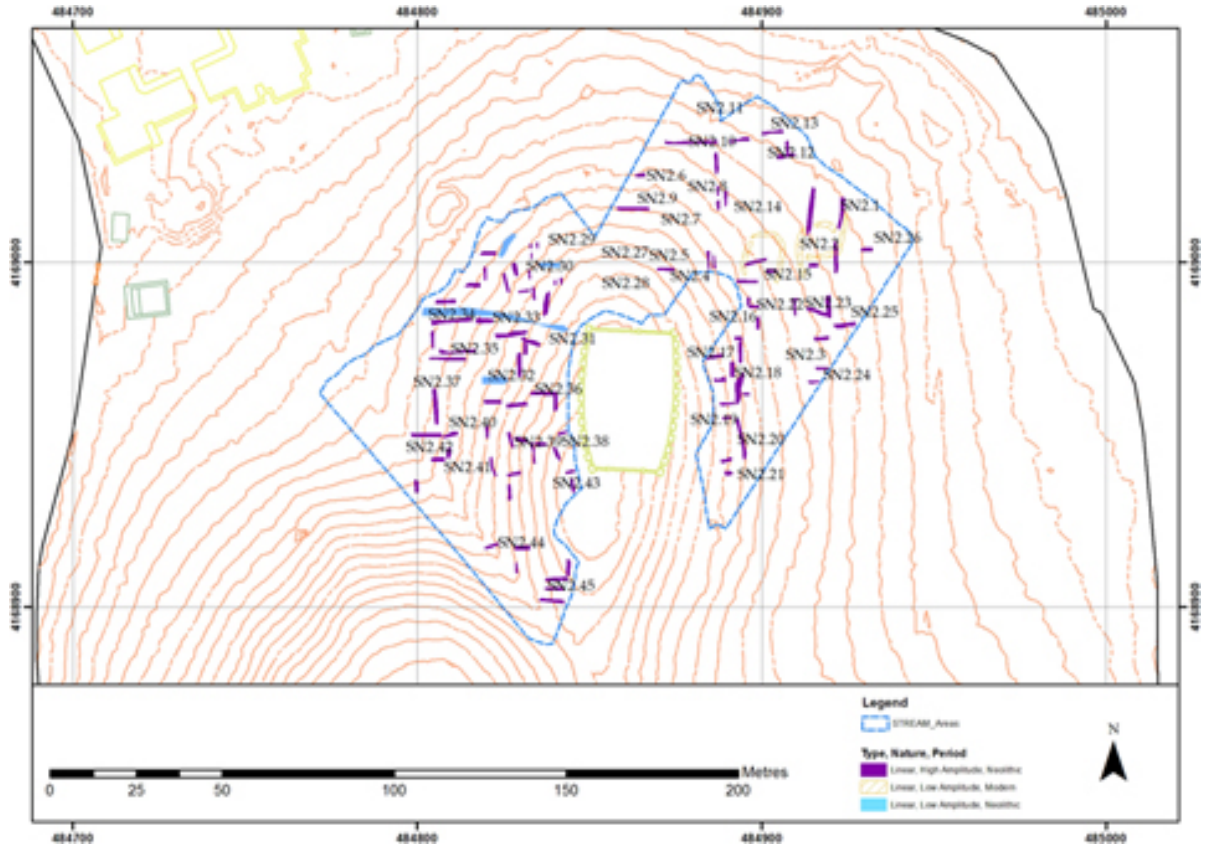

Figure 7.21. Interpretation plot derived from the STREAM results for the north part of the east mound at 1.0-1.25m depth.

An interesting band of anomalies cuts across the survey area in a broadly north-east to south-

west direction. Some short anomalies **[SS1.11]** and **[SS1.12]** are visible to the north, but some very clear linear anomalies **[SS1.13]** – **[SS1.17]** indicate the remains of structures following broadly the line of the steepest gradient of the mound. The anomalies extend to the south and east in the form of two rectilinear features **[SS1.18]** and **[SS1.19]** measuring 8m and 10m across respectively, indicating the walls of buildings. A number of fainter high amplitude anomalies are located to the east **[SS1.20]**, **[SS1.21]**, **[SS1.22]** and **[SS1.23]** however it is difficult to see any coherence or articulation in the form of the features. In the south eastern portion of the survey area several linear and rectilinear anomalies **[SS1.24]** – **[SS1.29]** do suggest the continuation of the walls of structures.

The second level of STREAM GPR (1m – 1.25m) in the vicinity of the north shelter (Figures 7.20 to 7.23) shows a continuation of the features located in the shallower levels of the data. In the eastern part of the survey area two linear anomalies **[SN2.1]** running from north to south indicates walls of buildings. Two low amplitude curvilinear anomalies **[SN2.2]** and **[SN2.3]** indicate the remains of threshing floors. Along the northern edege of the shelter a double parallel set of linear anomalies **[SN2.4]** running from north to south, and a linear anomaly **[SN2.5]**. To the north two west-east linear anomalies **[SN2.6]** and **[SN2.7]** and a series of linear anomalies running from north to south **[SN2.8]** indicate the walls of buildings. A linear high amplitude anomaly **[SN2.10]** measuring 15m in length is also visible, together with a second linear anomaly **[SN2.11]**, and a set of linear and rectilinear anomalies to the east **[SN2.12]** and **[SN2.13]** show the presence of structures on the northern edge of the survey area. A double linear anomaly **[SN2.14]** indicates two parallel walls and a possible track-way running north over the flank of the mound. Several linear anomalies on the north-east side of the mound **[SN2.15]** indicate buildings to the north-east of the shelter, and a range of linear and rectilinear anomalies **[SN2.16]** – **[SN2.21]** measuring between 7m and 9m across show a line of structures running along the upper eastern side of the mound. Further linear anomalies **[SN2.22]** – **[SN2.26]** show

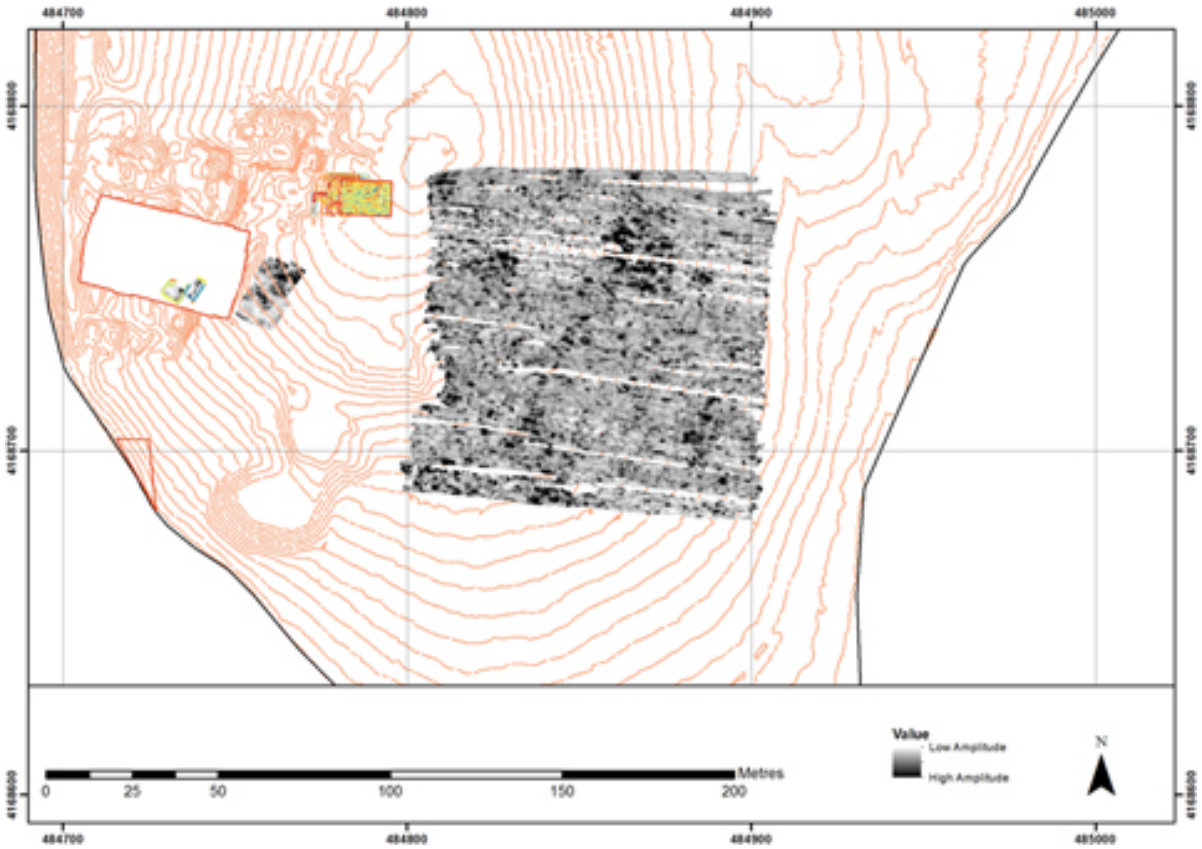

Figure 7.22. Greyscale of the STREAM results for the south part of the east mound at 1.0-1.25m depth.

structures extending to the eastern edge of the survey area.

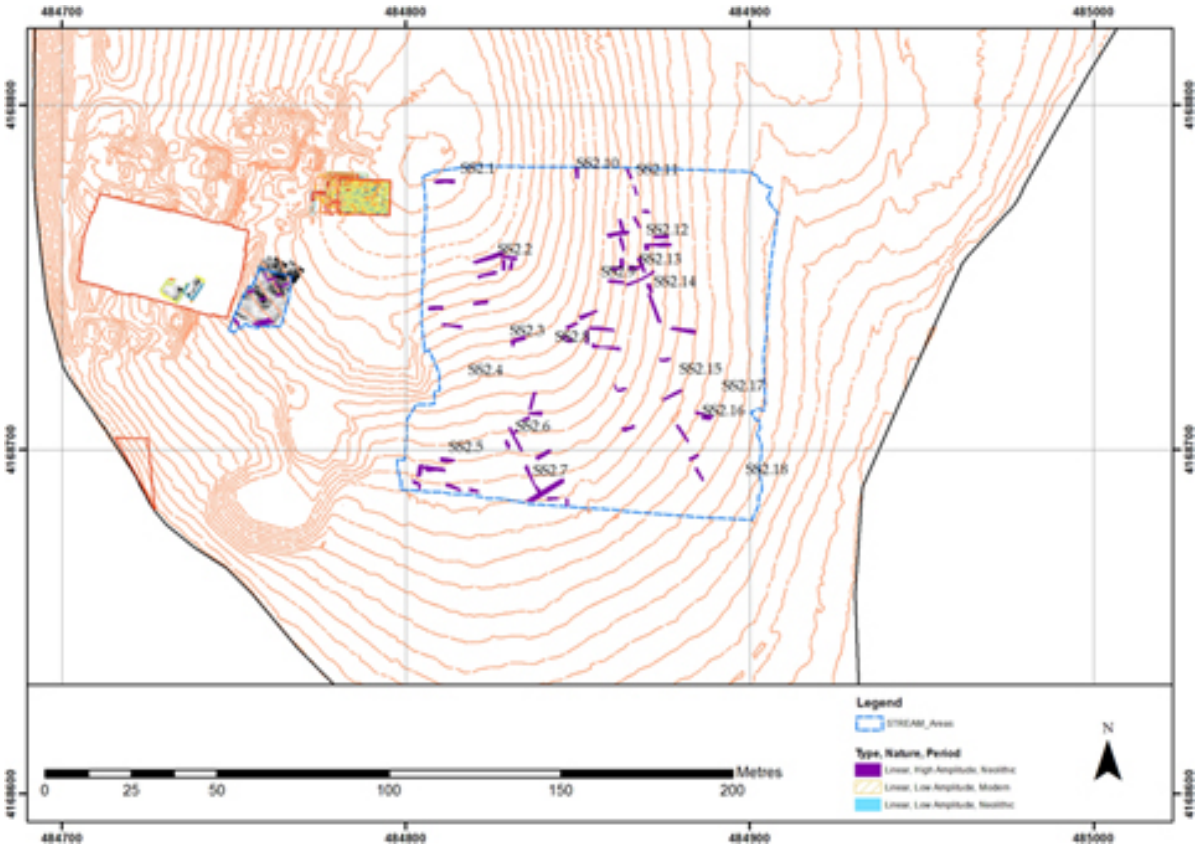

Figure 7.23. Interpretation plot derived from the STREAM results for the south part of the east mound at 1.0-1.25m depth.

Two linear anomalies **[SN2.27]** and **[SN2.28]** mark the extension of buildings along the north-western side of the mound. Structures extend to the west **[SN2.29]** and **[SN2.30]** measuring between 7-8m across, and comprising high amplitude linear anomalies, and some low amplitude deposits possibly associated with routes or track-ways across this part of the site. Linear anomalies **[SN2.31]** and **[SN2.32]** extending out from the north shelter indicate buildings. A strong linear low amplitude anomaly **[SN2.33]** and **[SN2.34]** mark a track-way across the western side of the mound. A large rectilinear feature **[SN2.35]** measuring 9m by 6m indicates a further building with a double parallel linear anomaly marking its southernmost extent. A number of walls **[SN2.36]** – **[SN2.40]** mark structure to the west and south west of the excavations. These extend south **[SN2.41]** – **[SN2.44]** to the southern edge of the survey area.

The STREAM data from the southern part of the mound at this depth indicates a linear anomaly **[SS2.1]** running from west to east. Several linear and rectilinear anomalies on a similar alignment **[SS2.2]**, **[SS2.3]** and **[SS2.4]** also indicate buildings. These structures extend to the south **[SS2.5]**. However to the east the anomalies indicate a different alignment **[SS2.6]** and **[SS2.7]** suggesting two buildings measuring some 10m across each. Similar south-west to north-east alignments **[SS2.8]** are visible to the north, with both north-south alignments and structures following the alignment of the contours of the mound present up to the northern edge of the survey area **[SS2.9]** – **[SS2.14]**. Fainter traces of possible structures are visible to the south-east **[SS2.15]** – **[SS2.18]** showing buildings and walls aligned with the contours of the mound.

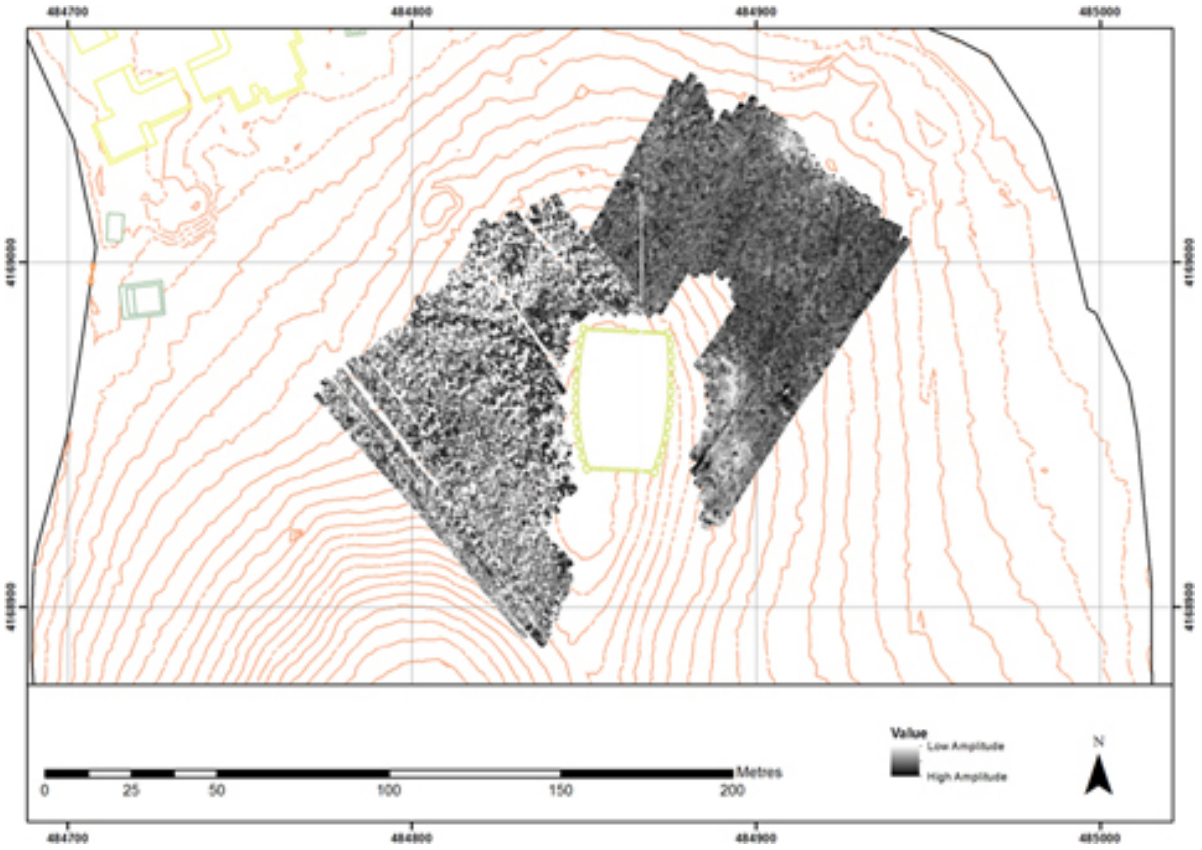

Figure 7.25. Greyscale of the STREAM results for the north part of the east mound at 1.75-2.0m depth.

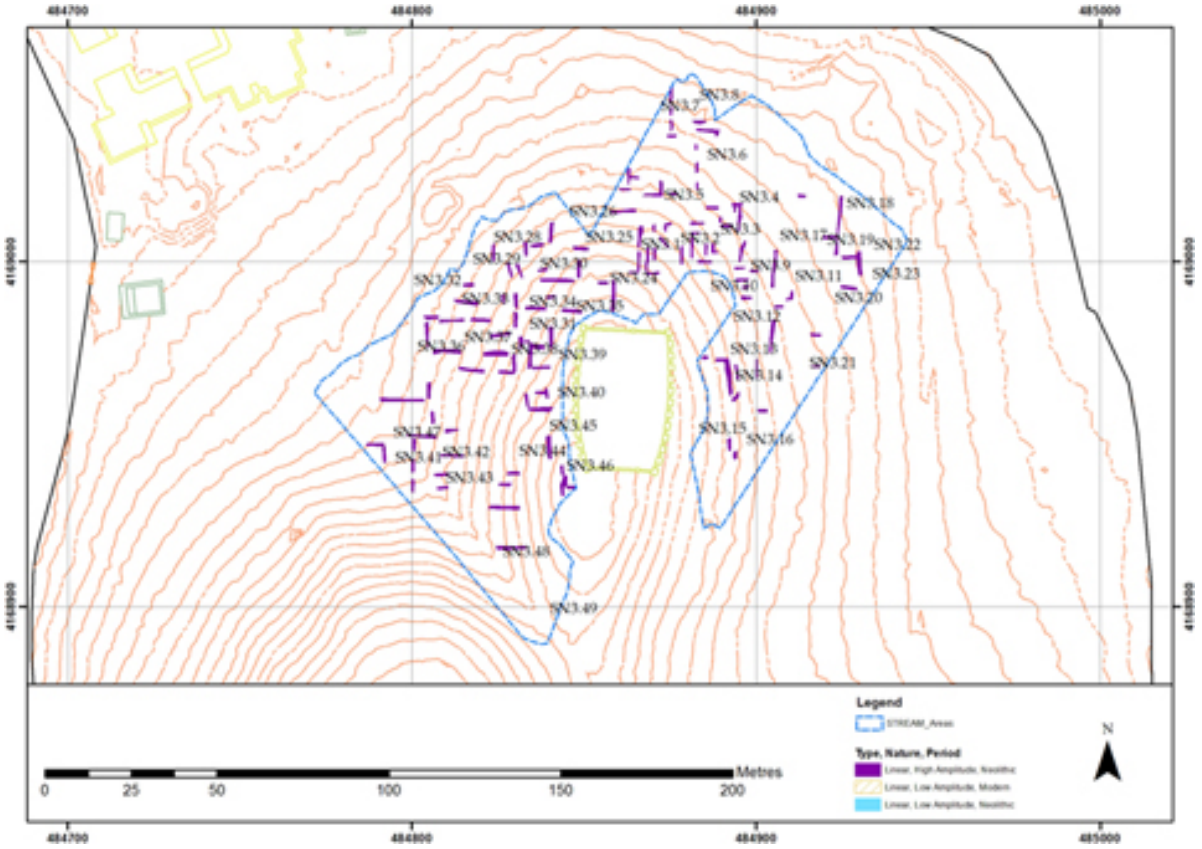

Figure 7.25. Interpretation plot derived from the STREAM results for the north part of the east mound at 1.75-2.0m depth.

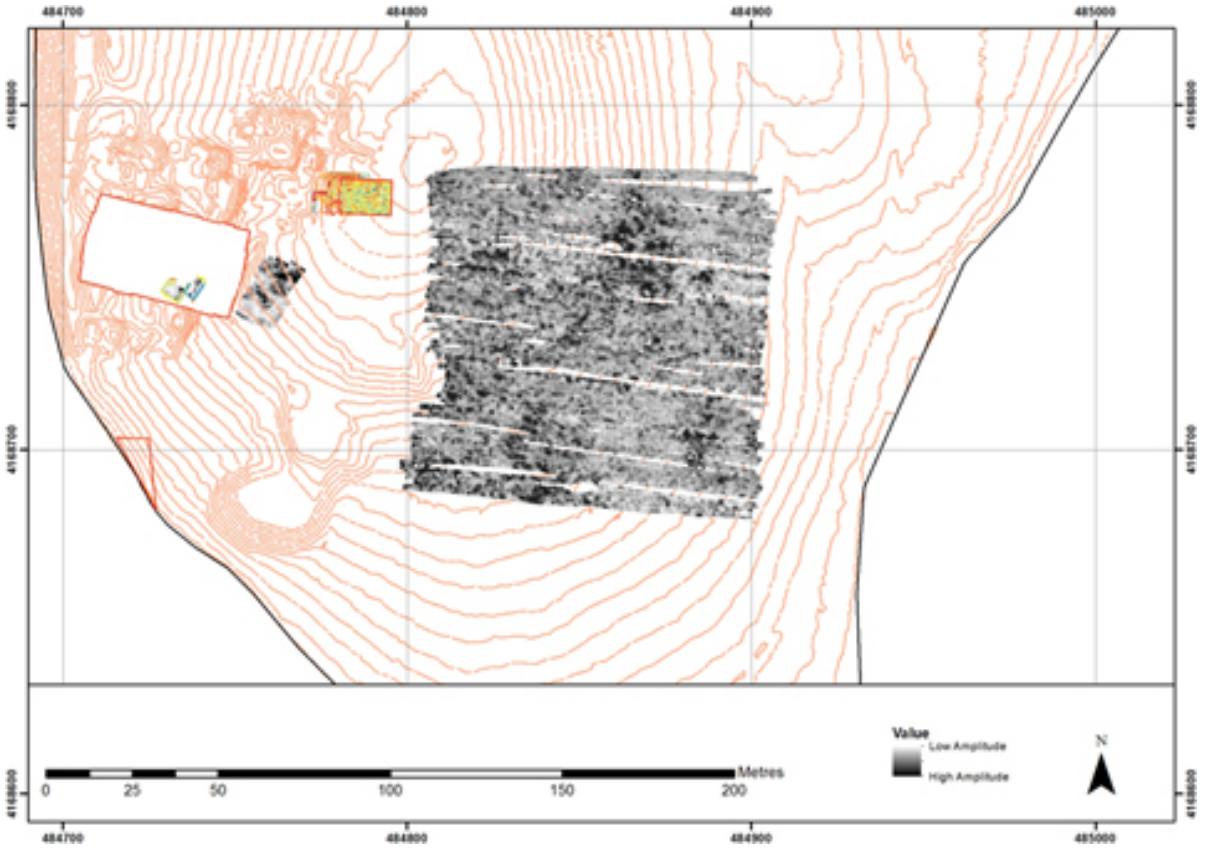

Figure 7.27. Greyscale of the STREAM results for the south part of the east mound at 1.75-2.0m depth.

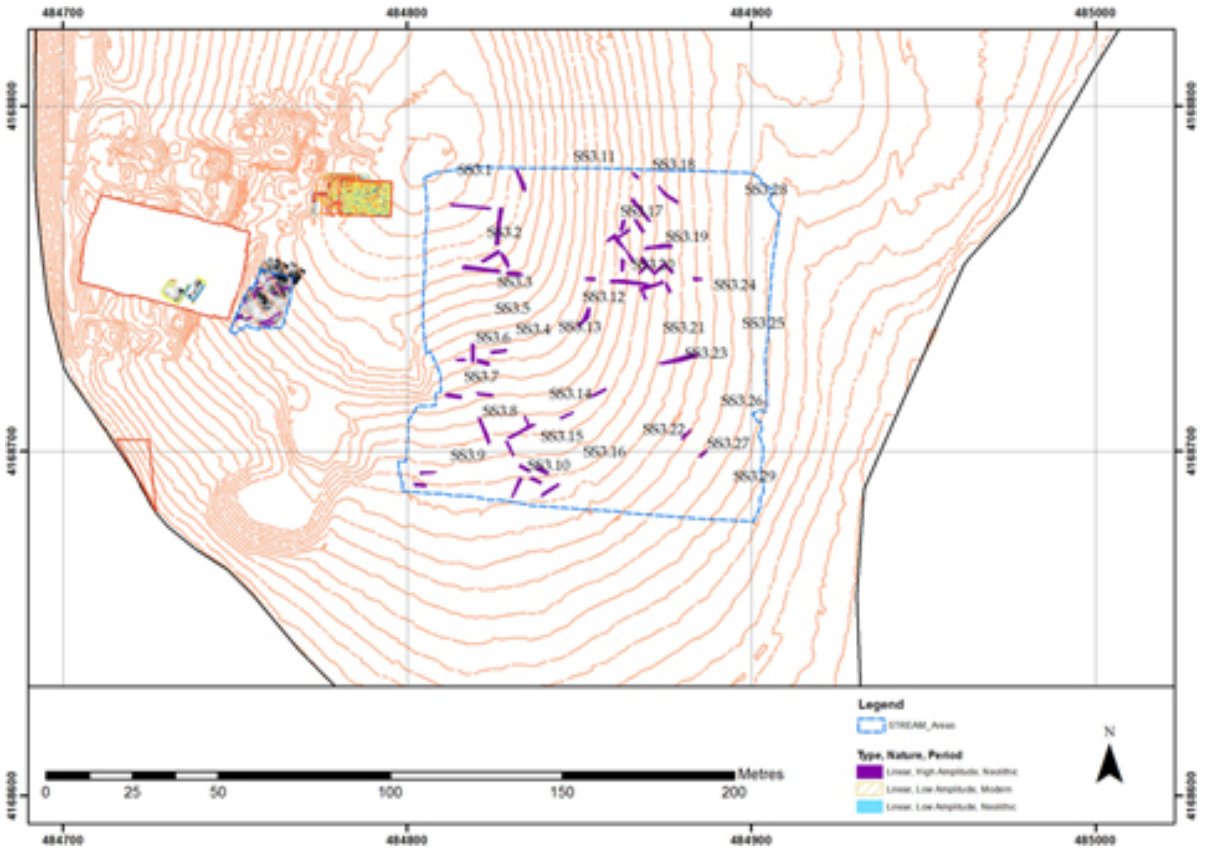

Figure 7.27. Interpretation plot derived from the STREAM results for the south part of the east mound at 1.75-2.0m depth.

The third level of STREAM X data (1.75m – 2.00m) shows anomalies similar in form and nature to those indicated in the previous levels (Figures 7.24 to 7.27). To the north of the north shelter a strong pattern of linear anomalies **[SN3.1]**, **[SN3.2]** and **[SN3.3]** extends outwards some 14m from the edge of the shelter, indicating several buildings adjacent to one another. A corner to these structures is visible **[SN3.4]** however several further linear anomalies on the lower flank of the mound **[SN3.5]** – **[SN3.8]** indicate buildings on the lower parts of the mound. Several buildings **[SN3.9]** extend out from the eastern side of the shelter, and strong linear high amplitude anomalies and rectilinear features **[SN3.10]** – **[SN3.14]** mark building as lined along the upper side of the mound. Several linear anomalies to the east, some measuring over 17m in length, indicate the presence of buildings to the east **[SN3.15]** – **[SN3.23]**. These buildings also extend to the west from the top of the mound **[SN3.24]** comprising several linear anomalies **[SN3.25]** and **[SN3.26]** and shorter linear anomalies along the western edge of the survey area **[SN3.27]** and **[SN3.28]**, enclosing two rectilinear anomalies **[SN3.29]**, **[SN3.30]**, **[SN3.31]** and **[SN3.32]**. These buildings extend to the south with a set of linear anomalies **[SN3.33]** – **[SN3.35]** and a large rectilinear feature **[SN3.36]** measuring 23m by 8m, with several smaller rectilinear anomalies **[SN3.37]** – **[SN3.40]** projecting to the west of the north shelter. A series of structures are also visible to the west **[SN3.41]** – **[SN3.47]** and south of this area, extending from the shelter to the break in the topography to the south-west.

In the southern part of the mound several west to east aligned high amplitude anomalies [SS3.1] and [SS3.2] mark the north-west corner of the survey area. These extend down the western side of the area [SS3.3] - [SS3.9] showing buildings on the side of the mound. The central portion of the area is marked by a complex of structures [SS3.10] – [SS3.18] on a broadly south-west to north-east alignment. Very faint traces of linear anomalies [SS3.19] – [SS3.29] suggest structures to the east of these features.

The Single Antenna GPR Survey

The single antenna GPR survey conducted in 2010 and 2012 revealed a number of features immediately to the north of the north shelter and on the flanks of the mound. A single strong high amplitude linear anomalies **[g1]** and **[g2]** runs from west to east close to the shelter for a distance of 28m with a short break in it, suggesting the line of a wall associated with a series of buildings. Two rectilinear anomalies **[g3]** measuring some 4m by 6m indicate the presence of two adjacent buildings to the east. A second linear high amplitude anomaly **[g4]** and runs for 30, from west to east forming one side of a rectilinear anomaly **[g5]** showing a further building. A linear high amplitude anomaly **[g6]** and **[g7]** runs from south-east to north-west for a distance of over 30m, at a complete tangent to the orientation of most of the other anomalies, and may

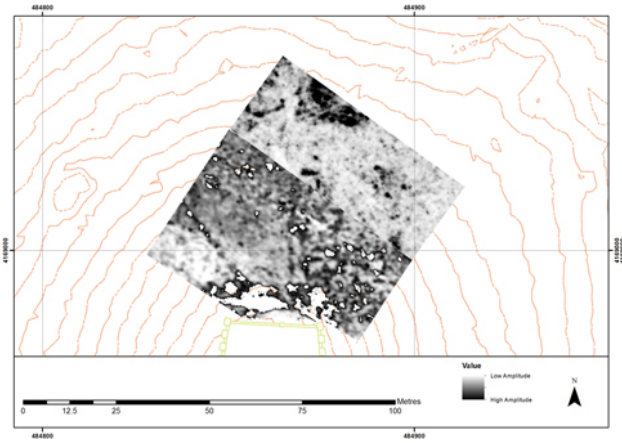

Figure 7.28. Greyscale image of the single antenna GPR survey results near the north shelter.

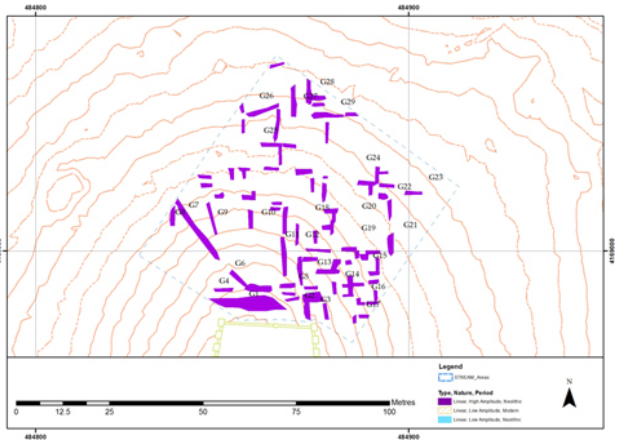

Figure 7.29. Interpretation plot derived from the single antenna GPR survey results from near the north shelter.

suggest a wall or other structure. A short linear anomaly **[g8]** runs on the edge of the survey area from north to south.

A series of three short linear anomalies **[g9]** and **[g10]** indicate large buildings measuring some 7m across. Two smaller buildings are visible **[g11]** and **[g12]** immediately to the east, with a complex of rooms or buildings **[g13]**, **[g14]** and **[g15]** to the east and south, measuring in total some 18m by 12m. The structures run to the eastern edge of the survey area **[g16]** and **[g17]**. A set of linear anomalies **[g18]** running from north to south for a distance of 15m, marking the western side of a possible large open area **[g19]** measuring some 14m by 9m. A second open area **[g20]** is located immediately to the north. The high amplitude linear anomalies continue to the north and east **[g21]**, **[g22]**, **[g23]** and **[g24]** showing the extension of structures onto the flanks of the mound.

Further to the north, the double linear anomaly located in the vicinity of the shelter continues to run for a further 55m to the north **[g25]**, with evidence of linear anomalies to the north and west **[g26]** suggesting further structural remains. Broader linear high amplitude responses **[g27]**, **[g28]** and **[g29]** also indicate remains of buildings.

To the East of the South Shelter

The more focused GPR surveys of the area immediately to the east of the southern shelter, and of buildings 80 and 89 (Figure 7.30) within the southern excavation area, indicate a number of features. To the east of the shelter both single antenna and STREAM X surveys indicate a continuation of the walls and buildings found in the excavation, and the presence of a number of possible tombs. Results of the GPR survey from buildings 80 and 89 also show the presence of burials in the north-eastern corner of each building, and the presence of room furniture at a depth of 0.5-1.5m. Deeper deposits indicate the presence of other deposits and features, probably associated with earlier rooms and buildings, also indicating the presence of deeper burials and pits.

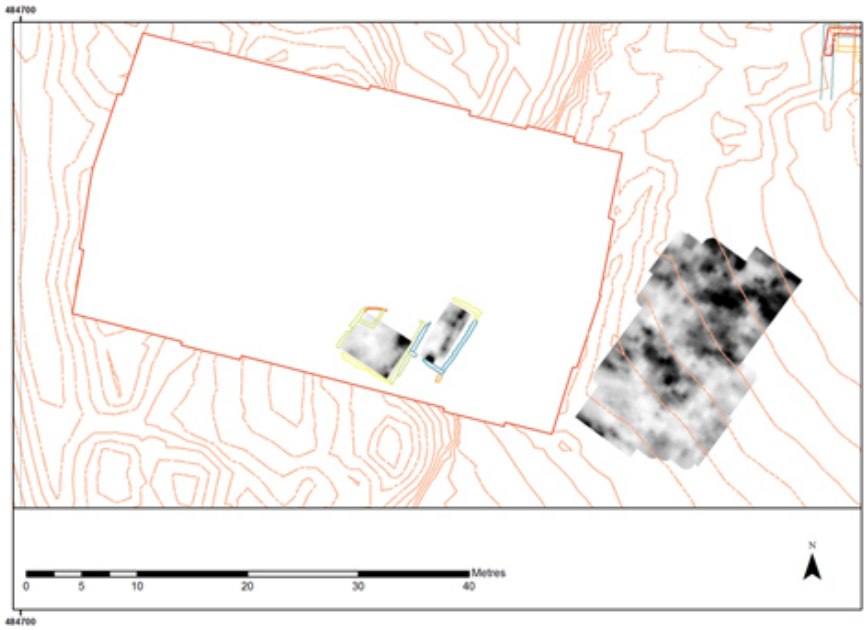

Figure 7.30. Single antenna GPR survey results to the east of the south shelter, and in buildings 80 and 89.

Work beyond the east mound focused on the locating of possible palaeo-channels to the south and south-west of Çatalhöyük. A topographic survey conducted with the GPS in this area indicated a rise in the topography which, together with the results of the magnetometry (Figure 7.8), shows the location of a possible channel on the higher ground in the eastern part of a modern arable field, running from south to north towards the lower ground to the south of the

west mound. It is interesting to note that the topographic variations in the area owe more to the post-medieval field boundaries surrounding the mounds than the ancient

3.6 Buildings 80 and 89

Survey in the floorspace of Buildings 80 and 89 (Figures 7.31 and 7.32) indicated a number of internal furnishings at increased depth in the rooms. The slices at a depth of 0.7-0.8m in Building 89 indicates the presence of a burial in the north-eastern corner of the buildings, and a line of postholes along the eastern wall of the building.

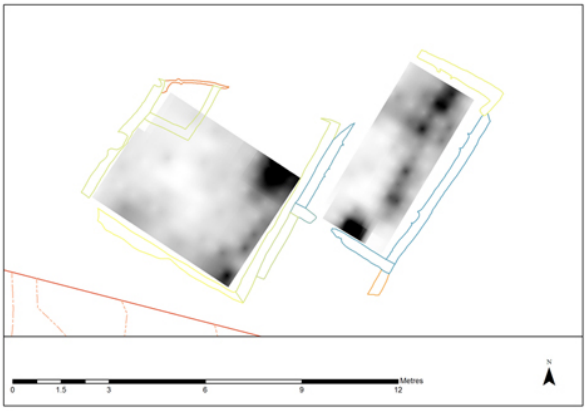

Figure 7.31. Single antenna GPR survey results in buildings 80 and 89.

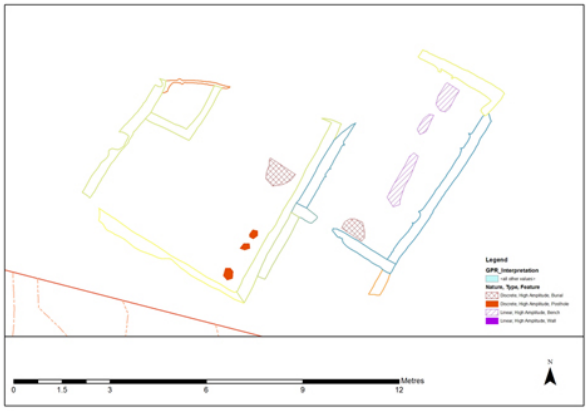

Figure 7.32. Interpretation plot derived from the GPR survey results from buildings 80 and 89.

Discussion

The results of the combined geophysical survey at Çatalhöyük have facilitated the mapping of many of the buried structures and features at the site (Figures 7.33-7.35). While many linear and curvilinear features can be associated with the modern agriculture and use of the mound for farming activity, and some of the positive discrete anomalies on the eastern flank of the mound can be ascribed to later burials, a large number of anomalies in the magnetometry, and particularly in the GPR survey results show Neolithic structural remains.

On the northern part of the mound the settlement can be seen extending northwards down the flank of the mound, also to the east. The settlement concentration also runs to the west and south, although the break in slope and the small valley in the topography seem to indicate either a break or a reduction in structures. At least one if not two track-ways with enclosing walls are indicated running into the settlement from the north. Two parallel linear anomalies running to the west also seem to indicate a track-way running from the northern part of the settlement downslope to the west.

Results of the survey in the southern part of the mound are in some cases less clear. The magnetomery indicates a number of strcutres and walls, however there is more disturbance in the results for this area. The STREAM X data shows some west-east alignment of walls and buildings, however the data were collected in a west-east series of traverses and as a result some of the features are difficult to find. A change in orientation seems to occur along the higher flank of this area, suggesting a strong line of structures, with fewer linear features to the east and south, showing some settlement but nothing of the scale of concentration of settlement as can be seen on the main mound.

The survey to the east of the south shelter indicates the continuation of structures beyond the shelter, with a strong wall feature and a series of possible burials. Similarly the single antenna surveys in the southern excavations indicates room furniture and burials in buildings 80 and 89.

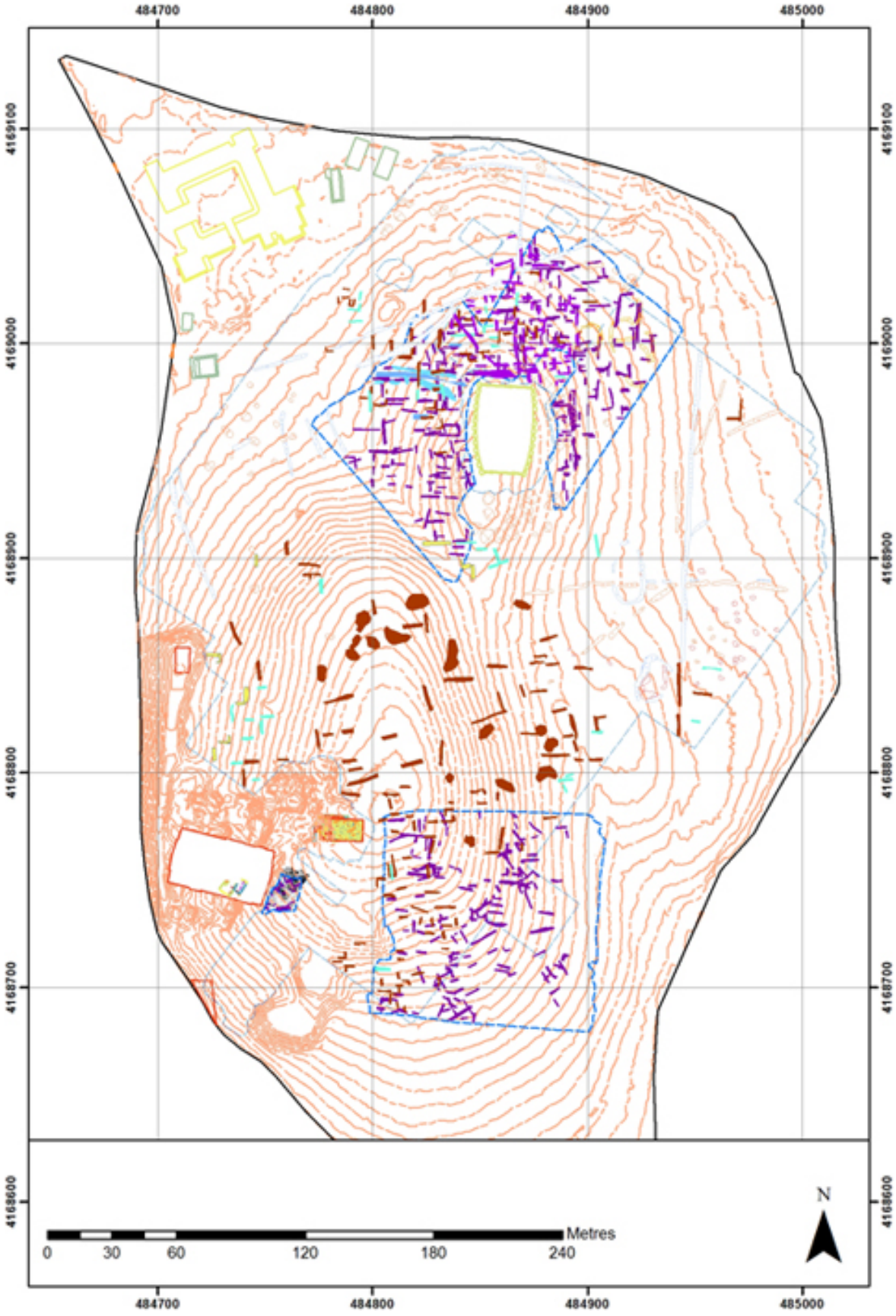

Figure 7.33. Composite plot of the magnetometer and GPR interpretations for the east mound.

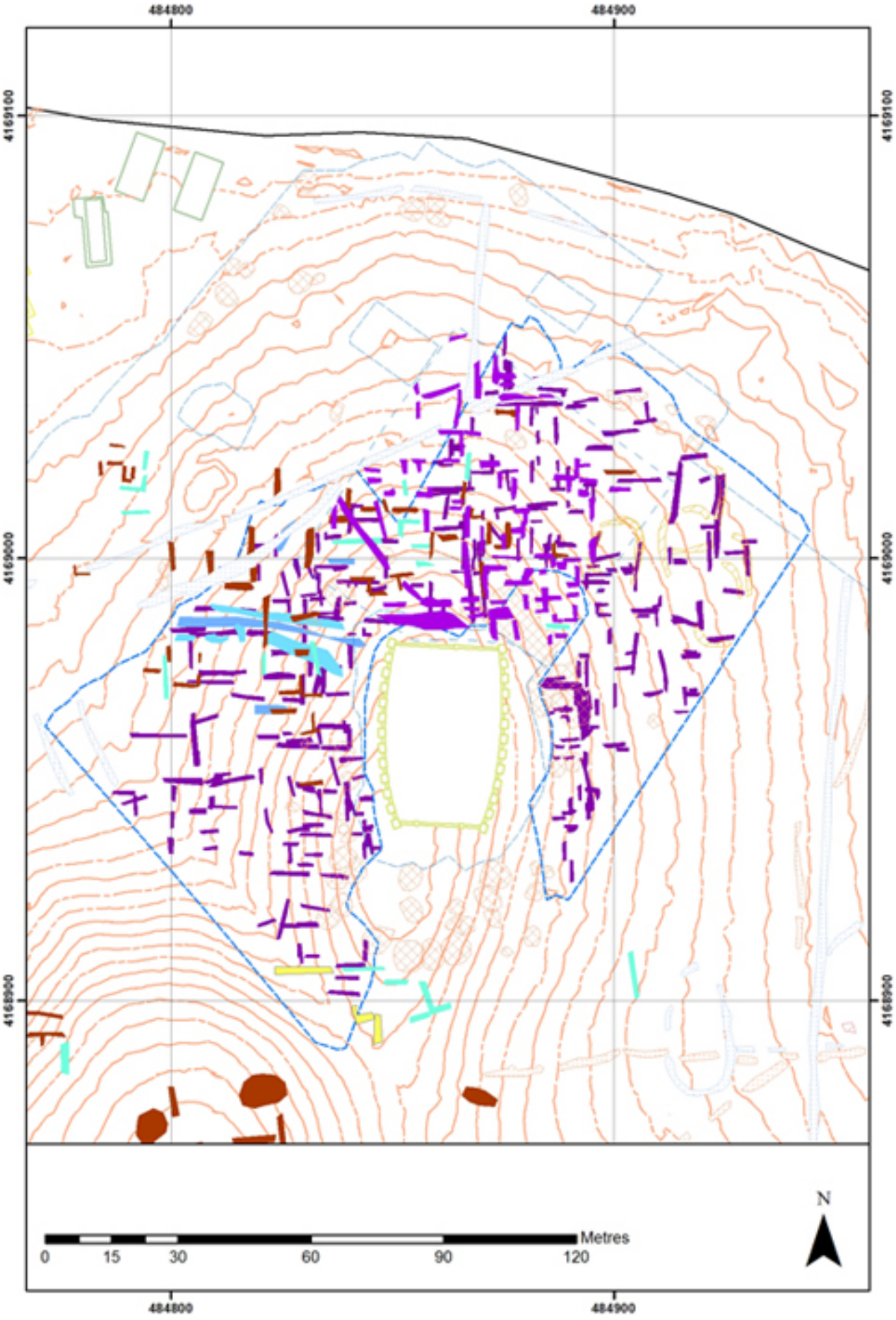

Figure 7.34. Composite plot of the magnetometer and GPR interpretations for the northern part of the east mound

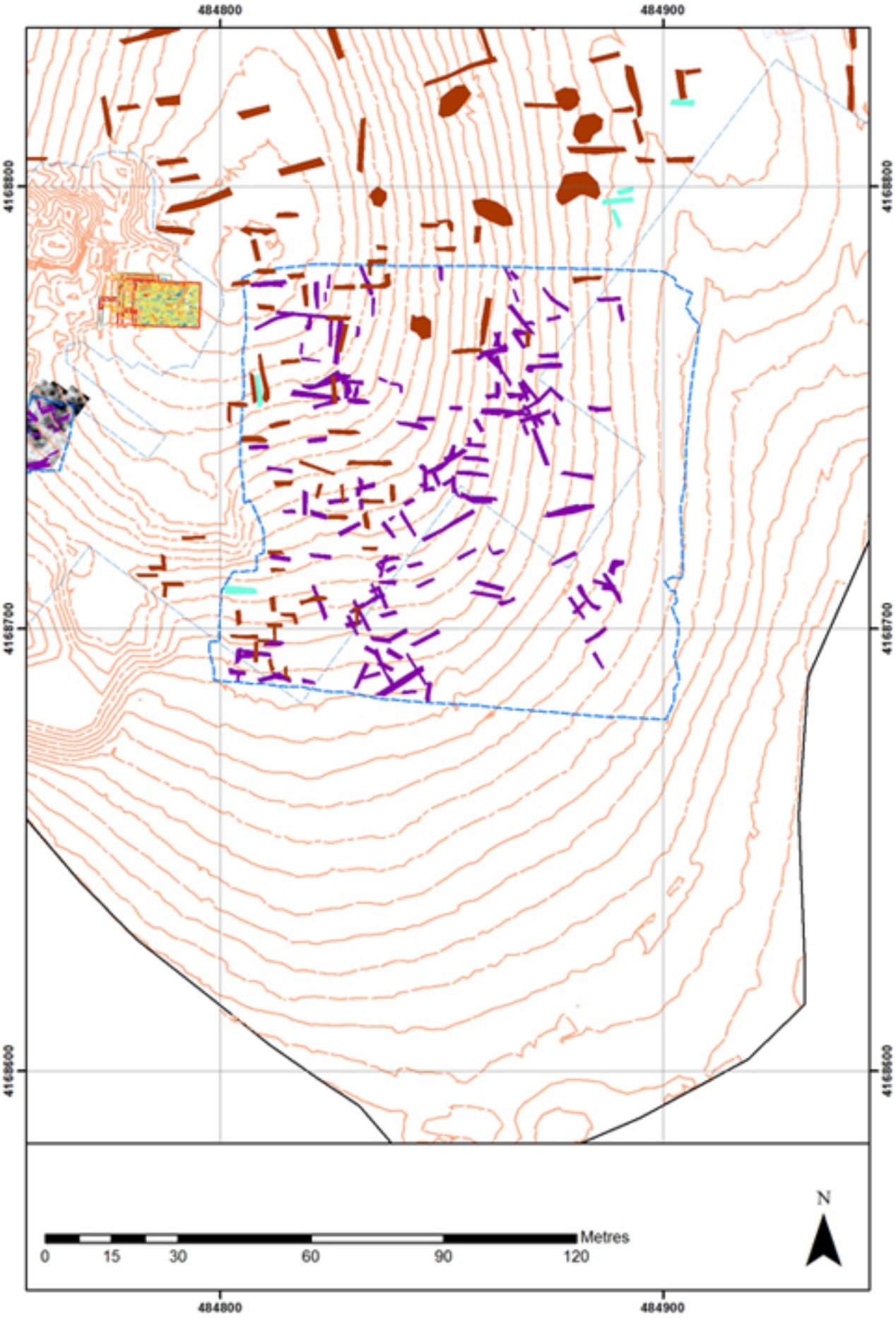

Figure 7.35. Composite plot of the magnetometer and GPR interpretations for the southern part of the east mound.

Recommendations for Ground-Truthing

On the basis of the integrated geophysical survey results for the east mound at Çatalhöyük, and the extent of anomalies represented in the data, there are a number of locations where ground-truthing through trial trench excavation would prove fruitful (Figures 7.36 and 7.37). This would enable investigation of anomalies and features present in the geophysical survey data, and would allow the edges of the known settlement at Çatalhöyük to be assessed, together with the varying nature of some of the structural deposits. Excavation could be used to investigate the following:

Area 1 – An area measuring 11m by 9m to assess the presence and nature of structures on the northern flanks of the mound, including a possible building.
Area 2 – A trench measuring 10m by 8m to investigate a double linear feature marking a possible track-way allowing access to the central part of the mound from the north, and a possible building.
Area 3 – A small trench to investigate the strong linear anomaly in the single antenna data running from south-east to north-west.
Area 4 – A trench measuring 10m by 8m to investigate the presence of structures to the west of the north shelter.
Area 5 – A trench measuring 10m by 8m to investigate the nature of the linear anomalies running along the line of the contours of the topography of the mound, and to see if this marks an edge to the area of the settlement.
Area 6 – A trench to investigate the buildings and line of structures running along the line of the contours of the mound.
Area 7 – A trench measuring 6m by 7m to investigate the presence of buildings running on an east – west alignment associated with the main core of settlement in the southern part of the mound.

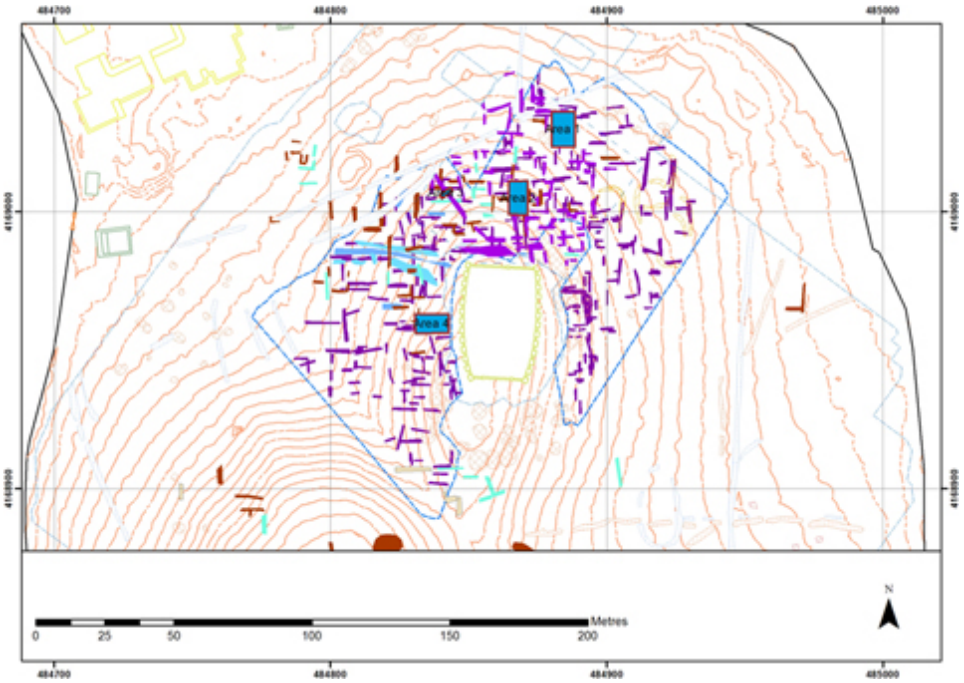

Figure 7.36. Recommended areas for ground-truthing and excavation on the northern part of the east mound.

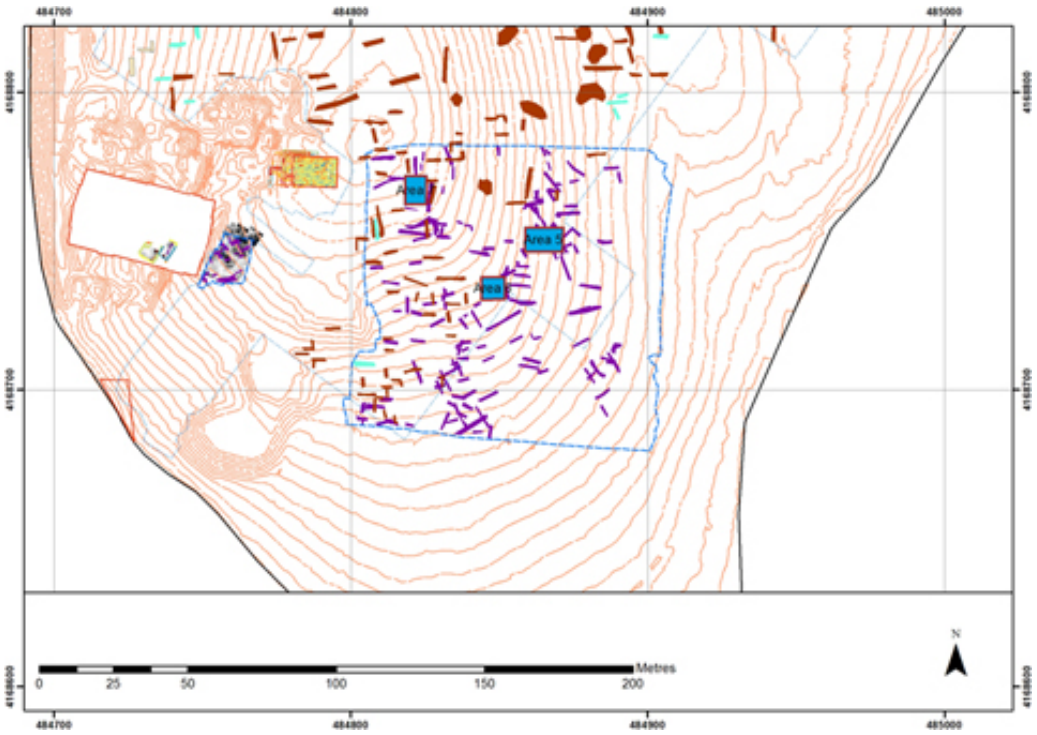

Figure 7.37. Recommended areas for ground-truthing and excavation on the southern part of the east mound.

In addition there is still scope to complete the magnetometer and GPR surveys of the east mound, and the possibility of extending the survey to the west mound also. Both GPR and magnetometry seem to respond well to the type of deposits present at Çatalhöyük, although not all features show clearly in each set of results when taken individually. It is therefore recommended that any future survey incorporates both methods as a means of optimising the interpretation of the survey results.

On the basis of the results of the topographic and magnetometer survey conducted off the mound, it would appear that the use of an integrated survey methodology would enhance the study of the environs of Çatalhöyük, particularly in relation to the study of the geomorphology and the location of archaeological deposits and settlements associated with the changing environment. This would be most suitable as a component of a larger geoarchaeological study of the landscape surrounding Çatalhöyük.

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8. Çatalhöyük Human Remains Team Archive Report 2012

Christopher Knüsel (1), Scott Haddow (2), Joshua Sadvari (3), and Jennifer Byrnes (4)

(1)University of Exeter, UK, (2)Cranfield University, UK, (3)The Ohio State University, USA, (4)University at Buffalo, USA

During the 2012 field season, the human remains team (Larsen, Knüsel, Haddow, Sadvari, Agarwal, Glencross, Byrnes, Betz, Nachman, Kurt, Gamble, and Moore) worked closely with the excavation team to assist in excavating and lifting the human skeletal remains as they were uncovered in the field, processed the newly recovered skeletons in the laboratory, worked on a variety of research projects, continued preparations for publications (Cotsen volumes, 2013) and conference presentations (Society for American Archaeology, 2013), and held regular meetings with team leaders from other on-site labs to facilitate the integration of analyses between labs during the final phase of the Çatalhöyük Research Project.

Several research and curation-related projects were initiated or continued during the 2012 season:

Sabrina Agarwal, Bonnie Glencross, and Inbal Nachman continued work on their project examining bone remodeling and fragility from a life course perspective. They are specifically looking at bone remodeling and metabolism (collecting samples for cortical and trabecular bone microscopy and radiography), bone fractures/trauma, and paired osteobiographical data of the adults and subadults from the site.

Jennifer Byrnes collected non-metric data from 68 Late burials for her dissertation work on the Late Roman and Early Byzantine periods at Çatalhöyük. She also collected a tooth and rib bone sample from each individual for export. The bone samples will be radiocarbon dated, and the tooth samples will be analyzed for strontium and oxygen stable isotopes in an effort to examine questions pertaining to migration through this area of the Roman and Byzantine Empires.

Joshua Sadvari spent the early part of the 2012 season collecting various datasets from the Neolithic dentitions, including linear enamel hypoplasia, carious lesions, and antemortem tooth loss. In the latter part of the season, he began data collection for his dissertation research, which focuses on reconstructing the activity patterns and workload of Çatalhöyük's Neolithic inhabitants, with a microscopic analysis of extra-masticatory tooth wear; data for osteoarthritis and entheseal changes will be collected during the 2013 field season.

Barbara Betz, in conjunction with Cansu Kurt and Inbal Nachman, oversaw the labeling of 162 total individuals from primary, secondary, and primary disturbed burial contexts, spanning the 2006-2011 field seasons. Seven individuals with carbonized bone (Sk (18447), Sk (18457), Sk (18464), Sk (18496), Sk (18701), Sk (19022), Sk (19500)) were not labeled so as to prevent contamination in anticipation of future testing on these remains.

The 2012 season was the second of an on-going program of research by the Newcastle University team focusing on the Late (that is, Roman, Byzantine, and Islamic) cemetery at

Çatalhöyük and its context. Michelle Gamble completed inventories for 38 Late burials excavated from the North Area between the 2003-2008 field seasons. Estimations of age and sex, as well as a preliminary analysis of paleopathology were completed, although further examination is needed for the rest of the post-Chalcolithic skeletal series from the North Area before broader conclusions can be drawn regarding the health and demography of the Late remains. Sophie Moore was present at Çatalhöyük for five days to assess the feasibility of a larger survey targeted at locating the Late settlement associated with the cemetery. Two days of field walking were conducted covering a distance of 58 km; two areas of high ceramic concentration, including Roman and Medieval sherds, were located. These areas of high concentration are likely to indicate the locations of settlements; further investigation is planned for next year.

At the end of the 2012 excavation season, the skeletal remains of at least 62 individuals were excavated: thirty-three Neolithic and nine post-Chalcolithic individuals from the North Area, eight Neolithic individuals from the South Area, and four Neolithic and eight post-Chalcolithic individuals from the TPC Area. Burial descriptions and basic osteobiographic information for each individual according to excavation area and time period are provided below.

Please note that the following descriptions employ anatomical terminology for the segments of the upper and lower limbs: arm (humerus), forearm (radius and ulna), wrist (carpals) and hand (metacarpals and phalanges) and thigh (femur), leg (tibia and fibula), ankle (tarsals), and foot (metatarsals and phalanges). The 'skull' refers to the cranium and mandible; this has been further defined when used to describe manipulations of the dead. When 'skull' is used, it is usually in the context of sex determination and refers to both the cranium and mandible.

North Area Neolithic burials

Space 40

Space 40 is located in the northeast corner of the North Area of Çatalhöyük's East Mound and was first defined during the 1993-94 surface scrape. Sp.40 is delineated by two walls, an eastern wall (F.2827) and a northern wall (F.2829), both of which were exposed in 2007 during the excavation of Foundation Trench 3. The internal surfaces of these walls (western surface of F.2827 and southern surface of F.2829) are covered with plaster. Aside from those features exposed during the excavation of Foundation Trench 3 in 2007, Sp.40 had remained largely unexcavated until the 2012 field season. Working in conjunction with the archaeologists, the human remains team excavated a total of 11 individuals from Sp. 40 along with a substantial amount of disarticulated skeletal remains, which will be evaluated in more detail during the 2013 field season.

F.3661, Sk (19472), Cut (20406), Fill (20405)

F.3661 represents a primary disturbed adult burial, Sk (19472). Based on lab assessment, this individual's age was estimated to be that of a young adult (20-30 years), and the sex was designated as a probable female. Sk (19472) was buried on its left side in an east-west orientation, with the head to the west and facing north. The grave of Sk (19472) was disturbed by two later interments, those of Sk (20419) (F.3667) and Sk (19484) (F.3662). The right and left lower limbs of Sk (19472) were not found in articulation and were likely disturbed by the grave cut (20420) for Sk (20419). This suggests that Sk (19472) was buried in a flexed position with the knees drawn toward the chest; if the individual was buried in an extended position, the lower

limbs would likely have still been in articulation as the area to the east of F.3661 was undisturbed. It is likely that the lower limbs of Sk (19472) are among the disarticulated remains found in Sp.40, a possibility that will be further assessed in 2013.

F.3662, Sk (19484), Cut (19485), Fill (20203)
F.3662 represents the primary disturbed burial of a child, Sk (19484), in relatively good condition. Based on the dentition, the skeleton was estimated to be approximately eight years of age. The skeleton was largely complete with the exception that the cranium was missing. However, the mandible, hyoid, and first cervical vertebra were present and in articulation indicating that the cranium was likely present at the time of this individual's burial. No separate cut was apparent in the region of the cranium, so it is difficult to speculate whether the cranium was absent due to the actions of Çatalhöyük's Neolithic inhabitants or due to more recent disturbances stemming from the close proximity of Sk (19484) to the mound's surface. Sk (19484) was buried in a flexed position lying on its left side. The lower limbs were flexed with the knees drawn toward the chest. The hands were in close proximity to one another under the individual's flexed lower limbs with the left palm facing upward and the right palm facing downward. The long axis of the body was oriented east-west with the head to the east. In regards to possible grave goods, three stone beads (20203.x1) were found near the mandible of Sk (19484).

F.3663, Sk (19488), Cut (20409), Fill (20408)
F.3663 represents the primary burial of a child, Sk (19488), that was relatively complete and in good condition. Based on the dentition, the skeleton was estimated to be approximately six years of age. The long axis of the body was oriented northeast-southwest with the head in the northeast facing south/southeast. The body was placed on its left side with its right and left upper limbs tightly flexed at the elbow and hands drawn toward the face. Likewise, the lower limbs were tightly flexed with the knees drawn toward the chin.

F.3664, Sk (19489), Cut (19492), Fill (19491)
F.3664 includes the primary disturbed burial of a child, Sk (19489), currently represented by a fragmentary cranium and several deciduous and permanent teeth. Based on these dental remains, this skeleton was estimated to be approximately nine years of age. F.3664 was heavily disturbed by the grave cut (20409) for Sk (19488), which intruded upon the torso region of Sk (19489). It is possible that, due to this disturbance, a set of partially articulated lower limb bones that were assigned to the grave fill (20408) actually belong to Sk (19489). If these lower limb bones do belong to Sk (19489), then this individual appears to have been buried on its left side and oriented east-west with the head to the west and facing north. The lower limb bones from fill (20408) will be assessed during the 2013 season in an attempt to determine whether they can be age-matched and re-assigned to Sk (19489).

F.3665, Sk (19499), Cut (20407), Fill (20400)
F.3665 includes the primary disturbed burial of an adult, Sk (19499), represented by a fragmentary cranium, mandible, and the first five cervical vertebrae. Eruption of the permanent dentition was complete, and as no post-cranial remains were present, Sk (19499) could not be assigned to a more specific age category than that of adult (20+ years). Sex could not be determined due to the poor preservation of the diagnostic features of the cranium and mandible. The cranium was found lying on its left side facing southeast. The burial of Sk (19499)

was heavily disturbed by the later grave cut (20423) for Sk (20422), and this disturbance accounts for the lack of articulated post-cranial remains. Two pointed bone tools (20400.x1, 20400.x2) were found in the vicinity of Sk (19499) but could not be directly associated with the skeleton and so were not strictly considered to be grave goods.

F.3666, Sk (20411), Cut (20412), Fill (20410)
F.3666 represents the primary burial of a child, Sk (20411), of relatively good preservation. Based on the development of the dentition, the skeleton was estimated to be approximately 10 years of age. The long axis of the body was oriented north-south with the head in the south and face to the west. The body was placed on its left side. The right upper limb was loosely flexed at the elbow with the hand toward the individual's abdomen, while the left upper limb was more tightly flexed with the forearm across the chest and the hand toward the chin. The right and left lower limbs were both loosely flexed at the hip and knee with the knees drawn toward the chest.

F.3667, Sk (20419), Cut (20420), Fill (20418)
F.3667 includes the primary disturbed burial of an adult, Sk (20419). Eruption of the permanent dentition and fusion of the long bone epiphyses were complete indicating this individual to be an adult (20+ years), but diagnostic elements for making a more specific age estimation were not observable. Based on the sexually diagnostic features of the cranium, this individual was deemed to be of indeterminate sex. The long axis of the body was oriented northeast-southwest with the head in the northeast and facing north. This individual was buried lying on its right side with the upper limbs tightly flexed at the elbow and hands toward the chin and the lower limbs flexed at the hip and knee with the knees drawn toward the chin. Along with the burial of a subadult (Sk (19484)), Sk (20419) was the only other individual in Sp.40 to be buried with grave goods, in the form of stone beads. Over 200 small stone beads (mostly gray in color, but some also red, orange, and white) were found in three locations associated with Sk (20419), at both left and right ankles (20419.x1, 20419.x2) and near the mandible (20419.x3), suggesting that this individual was adorned with a necklace and anklets at the time of interment.

F.3668, Sk (20422), Cut (20423), Fill (20421)
F.3668 represents the primary disturbed burial of a child, Sk (20422), that was relatively complete and well-preserved despite slight disturbance from the grave cut (20412) for the later burial of Sk (20411). Based on the dentition, the skeleton was estimated to be approximately three years of age. The long axis of the body was oriented northwest-southeast with the head in the northwest and face toward the north/northwest. The individual was buried lying on its left side with both upper limbs loosely flexed at the elbow and both lower limbs tightly flexed at the hip and knee with the knees drawn toward the chest. The cephalic extremity was hyperextended at the neck, and as all associated elements were in articulation, this appeared to be the original position of interment rather than caused by later disturbance. Two pointed bone tools (20400.x1, 20400.x2) were found in the vicinity of Sk (20422), but the fill units (20421) and (20400) could not be separated during excavation. As such, these objects could not be directly associated with either Sk (20422) or Sk (19499) and so were not strictly considered to be grave goods.

F.3669, Sk (20442), Cut (20443), Fill (20441)

F.3669 includes the primary disturbed burial of a child, Sk (20442), that was relatively complete and in good condition. Based on the dentition, the skeleton was estimated to be nine years of age. The long axis of the body was oriented north-south with the head in the south and facing toward the northeast. The body was placed on its right side, and the lower limbs were tightly flexed at the hip and knee with the knees drawn toward the chin. The right upper limb was tightly flexed at the elbow with the hand drawn toward the chin, while the left upper limb was more loosely flexed at the elbow with the hand close to the chest. The burial of Sk (20442) was slightly disturbed in the area of the left shoulder girdle (the southeast corner) by the grave cut (20446) associated with the later interment of Sk (20445).

F.3670, Sk (20445), Cut (20446), Fill (20444)

F.3670 represents the primary burial of a child, Sk (20445), that was relatively complete and in fair condition. Based on the dentition, this individual was estimated to be seven years of age. The long axis of the body was oriented northwest-southeast with the head in the southeast and facing north. The right upper limb was flexed at the elbow with the hand toward the chest, while the left upper limb was flexed at the elbow with the hand across the chest and extending toward the right shoulder. The lower limbs were flexed at the hip and knee with the knees drawn toward the chest. As the burial of Sk (20445) was later than that of the nearby Sk (20442), the disturbances to F.3670 were likely due to its close proximity to the modern surface of the mound.

F.3683, Sk (20434), Cut (20435), Fill (20433)

Figure 8.1. Primary burial of an adolescent, Sk. (20434), excavated from Space 40 (F.3683).

F.3683 includes the primary burial of an early adolescent, Sk (20434), that was one of the most complete and well-preserved individuals to be excavated from Sp.40 (Figure 8.1). Based on the dentition and the stage of long bone epiphyseal fusion, this individual was estimated to be approximately 12 years of age, thus straddling the late childhood/early adolescent age categories. The long axis of the body was oriented northwest-southeast with the head in the northwest and face toward the east. The right and left upper limbs were very tightly flexed at the elbow with the hands toward the chin, and the right and left lower limbs were also very tightly flexed with the knees toward the chest. The very tight nature of the limb flexion, more so than any of the other individuals excavated from Sp.40, points to the possibility that this individual's limbs were wrapped or bound at the time of interment. This individual is also the only one excavated from Sp.40 displaying a dark brown/black discoloration on many of the bones, most likely from manganese in the grave infill (20433). The lack of disturbance to F.3683, despite its proximity to grave cuts for surrounding burials (F.3661, cut (20406); F.3664, cut (19492); F.3667, cut (20420)), suggests that Sk (20434) was the last individual to be interred in this area (the eastern portion) of Sp. 40.

Space 77

Space 77 is defined by two walls, one oriented east-west (F.221), and another oriented north-south (F.222), first recorded during the 1993-94 surface scrape. According to the archaeologists, the space appears to post-date Building 5, but pre-date Building 1. The internal wall surfaces are covered in thick plaster layers and the space itself contains a reddish burnt infill. A series of Neolithic interments were excavated within this space in 2012. All of the skeletal remains discussed below were clearly apparent upon initial exposure, but once lifted had degraded significantly, with few elements recovered complete and most highly fragmented. This poor state of preservation likely relates to their proximity to the modern surface of the mound. As such, the following information relies heavily on *in situ* observation.

F.3630, Sk (19460), (19448), (19459), (19481), Cut (20475), Fills (19447), (20450)

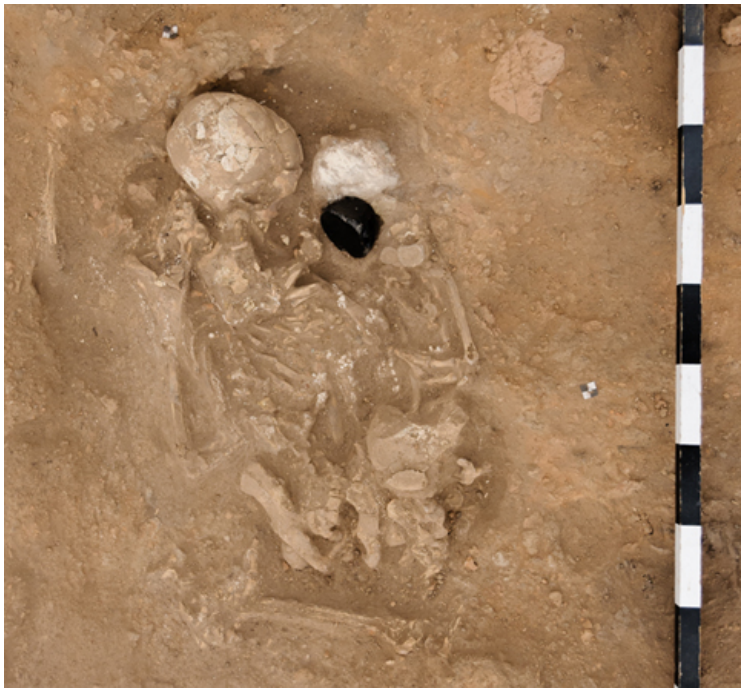

Figure 8.2. Primary burial of a subadult, Sk (19460), excavated from Space 77, along with one of the two obsidian "mirrors" recovered from the upper fill units of F.3630.

F.3630, the northernmost interment in Sp.77, contained the primary flexed burial of a subadult Sk (19460) (Figure 8.2). The incomplete, disarticulated remains of three additional individuals ((19448), (19459) and (19481)) were found in the upper grave fill (19447) at roughly the same level above the primary burial. The body of Sk (19460) was found prone and oriented east to west, with the head towards the west and facing north. The lower limbs were strongly flexed at the hip and knee, so strongly that the tibiae and fibulae were found beneath the femora bilaterally. The right upper limb ran parallel to the torso and flexed at the elbow such that the distal end of the forearm and hand were beneath the torso. The left upper limb was in a similar position on the left side. Numerous beads of various types were found around the ankles, chest, neck and head region of this individual. Two obsidian "mirrors" (19447.x3, 19447.x4) were also recovered from the upper fill units of this feature, although it is unclear whether they are directly associated with the primary burial Sk (19460).

Sk (19448) is a poorly preserved cranium belonging to an adult of 20+ years of age found in the upper grave fill (19447) directly above the thoracic region of Sk (19460). Sex could not be determined due to the poor state of preservation.

Sk (19459) is an articulated adult cranium and mandible belonging to a possible male. It was found lying on its right side facing west, and oriented north to south, vertex to the north. It was found in the upper grave fill (19447) above the left shoulder of Sk (19460).

Sk (19481) represents an agglomeration of disarticulated subadult skeletal remains found in the upper grave fill (19447) directly above the neck region of Sk (19460). The incomplete nature of the remains precludes a more precise age estimate.

The grave cut (20475) for Sk (19460) has not disturbed any earlier burials in this location. As such, the remains of the three disarticulated individuals found in the fill of F.3630 appear to represent a secondary deposition of skeletal remains brought from another location for the express purpose of being included in the grave fill (19447) of Sk (19460). Given the variable bony constituents and states of articulation of these secondary remains, it would seem that they were in different stages of decomposition at the time of re-deposition.

F.3684, Sk (20601), (19449), (19479), (20401), Cut (19597), Fill (20492)

Figure 8.3. Primary burial of an adult male, Sk (20601), excavated from Space 77, along with the disarticulated remains of three additional individuals (F.3684).

F.3684, located immediately south of F.3630, contains the primary burial of Sk (20601), a robust, mature adult male, along with the disarticulated remains of three additional individuals (Sk (19449), (19479) and (20401)) (Figure 8.3). The primary burial, Sk (20601), was tightly flexed on its left side and oriented east-west, with the head to the west, facing east, thus with the head flexed on the torso. Both lower limbs were tightly flexed against the torso, with the knees close to the chin. The right upper limb lay on top of the thorax and was flexed at the elbow at roughly 45º. The right wrist was palmar flexed under the chin. The left forearm of this individual was found between the right and left lower limbs, an observation consistent with extreme flexion and close packing of the body within the grave cut. A dry fracture was found on the left side of the mandibular corpus. Wedging of several lower thoracic and lumbar vertebral bodies, likely the result of compression fracture, was observed. A stature estimate of 170.89cm was calculated for this individual based on a maximum right femoral length of 46cm (measured *in situ*).

A white substance was found adhering to the frontal bone and other skeletal elements. A sample was taken from the left tibia for analysis. This white powdery substance is often observed on the cortical surfaces of bones at Çatalhöyük and may indicate either that this is a remnant of the decomposition process (adipocere?) or due to the affinity of some soil constituent to bones. A single turquoise bead was found next to the left humerus.

The incomplete, disarticulated remains of three additional individuals were found in the grave fill (20492) of F.3684, above the primary skeleton Sk (20601). Sk (19449) represents the incomplete, disarticulated cranial and infracranial remains of a young child (3-12 years old) found in the uppermost level of the fill (20492) of F.3684. Sk (19479) is a cranium belonging to an older adult of indeterminate sex. It was found on the southeastern edge of the grave cut (19597) facing south and oriented north to south, with its vertex uppermost. This cranium lay

next to Sk (20401), another isolated cranium located to the east. Sk (20401) is an isolated cranium belonging to a young adult female. It was found in the southwestern part of F.3684 to the west of and facing Sk (19479). The cranium was oriented east to west resting on the cranial base.

As with F.3630, the grave cut (19597) for Sk (20601) does not appear to have disturbed any earlier burials in this location. Thus, the bones of the three individuals found in the fill of F.3684 appear to represent a secondary deposition of skeletal remains brought from elsewhere.

The following sequence of burials was excavated in the southernmost portion of Sp.77:

F.3639, Sk (19450), (19493), Cut (20474), Fill (19461)

Figure 8.4. Disarticulated crania and long bones of at least two adults deposited in the southernmost area of Space 77 (F.3639). The cranium, mandible, vertebrae, and ribs in the lower left corner of the photograph belong to Sk (19451), a child of approximately 11-12 years of age. (F.3643).

F.3639 is a circular pit containing the disarticulated and poorly preserved adult skeletal remains of at least two individuals (Figure 8.4). The remains consist of long bones and two crania (Sk (19450) and Sk (19493)). The cut (20474) is located directly above the head area of the underlying Sk (20430) (F.3686) and appears to represent a "skull-retrieval pit" which was dug in order to access and remove the cranium and mandible of this earlier burial. The disarticulated skeletal elements found in the fill (19461) of F.3639 seem to have been carefully placed within the cut after the retrieval of the skull (cranium and mandible) of Sk (20430). Due to their poor state of preservation, it is unclear whether either of the two crania from F.3639 might belong to Sk (20430). The disarticulated long bones, however, clearly do not belong to the underlying Sk (20430), as the rest of the skeleton is intact; only the cephalic extremity (i.e. head) has been targeted by the cut for F.3639. F.3639 appears to be the last in a series of intercutting features located in the southernmost region of Sp.77

Sk (19450) is the poorly preserved adult cranium (possibly male) found on the northeastern edge of F.3639 resting on the cranial base in an east to west orientation. The first cervical vertebra (atlas) was found under the cranial base.

Sk (19493) is the poorly preserved cranium of an adult of indeterminate sex. It was found isolated on the southern edge of F.3639, oriented east to west, facing west.

F.3686, Sk (20430), Cut (20476), Fill (20428)

Figure 8.5. Primary disturbed burial of a middle adult male, Sk (20430), excavated from Space 77 (F.3686). The cranium, mandible, vertebrae, and ribs in the lower left corner of the photograph belong to Sk (19451), a child of approximately 11-12 years of age.

Directly below F.3639 lies F.3686, which contains the primary disturbed burial of a middle adult male, Sk (20430) (Figure 8.5). The body was placed on its back (leaning slightly on its left side) in a loosely flexed position with the head oriented to the west. Both lower limbs were drawn up against the abdomen and leaning to the left side of the body. The right upper limb was tightly flexed against the chest with the hand above the sternum, while the left upper limb was loosely extended alongside the body with the hand underneath the left foot. The cranium, mandible and several cervical vertebrae are missing; the presence of the hyoid and ossified thyroid cartilage, however, indicates that the cephalic extremity was intact at the time of interment. The skull (i.e. cranium and mandible) of Sk (20430) appears to have been intentionally removed at some point after burial via cut (19461) of F.3639 (see above). The disarticulated skeletal remains of at least two subadults were found in the fill (20428) near the feet; these likely derive from F.3643, an earlier burial in roughly the same location (see below).

F.3645, Sk (20457), Cut (20602), Fill (20461)

F.3645 contains the primary disturbed burial of a middle adult male, Sk (20457). Only the feet, *ossa coxae*, forearms and hands were found *in situ*. The rest of the skeleton appears to have been disinterred when the grave cut (20476) for Sk 20430 (F.3686) was dug. Loose skeletal elements found in the fill (20428) of F.3686 and also the fill (19461) of F.3639 may belong to Sk (20457). The skeleton appears to have been placed in a flexed position on its left side with the head oriented to the west. The right upper limb was flexed 90º at the elbow across the abdomen, while the left upper limb was loosely extended with the hand placed alongside the left foot. Disarticulated subadult skeletal elements found in the fill (20461) may derive from F.3643, an earlier burial located directly to the east, the cut of which (20603) overlaps the cut (20602) of F.3645.

F.3643, Sk (19451) (19578), Cut (20603), Fill (19496)

F.3643 represents the primary disturbed burial of a child (3-12 years old), Sk (19451). This burial appears to be the earliest in the southern sequence of interments. Only the cranium, mandible, cervical and superior-most thoracic vertebrae and associated ribs were in articulation, oriented in a northwest to southeast direction, cephalic extremity to the northwest, with the remainder of the skeleton found scattered throughout the fills of F.3645 and F.3686. Given the labile nature

of the cervical vertebrae, this individual was disturbed early in the process of decomposition and its remains scattered by subsequent burials in this location.

Sk (19578) is the incomplete, disarticulated remains of a neonate found in the fill (19496) of F.3643. The bones of this individual may derive from an earlier burial in this location that was subsequently disturbed by later interments; alternatively, it might represent a secondary re-deposition of skeletal remains at the time Sk (19451) was interred.

Space 84, Building 108

F.3622, Sk (19437), Cut (19438), Fill (19436)
F.3622 is the poorly preserved primary disturbed burial of a young child found in a midden. The burial was located just below the modern surface of the mound and thus it was in poor condition and heavily disturbed. The body was laid on its right side with its head to the west and facing south. The upper limbs appear to have been crossed in front of the torso, but post-depositional disturbances have made it difficult to be certain. The orientation of the lower limbs is also unclear. This burial appears to have been originally discovered in 2008, as it was covered by cloth and soil (Åsa Berggren, pers. comm.).

F.3644, Sk (20452), Cut (20451), Fill (20453)
F.3644 is a heavily disturbed primary burial of a subadult found in a midden (Sp.84, B.108). The disturbances to this burial are likely the result of rodent activity and its proximity to the modern surface; it does not appear to have been disturbed in Neolithic times, although it is difficult to be certain. The body was laid on it left side in a flexed position with the head to the west and facing north. The right upper limb was flexed tightly at the elbow, with the forearm alongside the head. The left and right lower limbs, as well as the left upper limb, are missing.

Space 87, Building 114

F.3629, Sk (8596), and Sk (8598), Cut (no cut assigned), Fill (19435), Basket (8597)

Figure 8.6. Primary burial of a young adult probable female, Sk (8598), excavated from Space 87, Building 114 (F.3629).

A tightly flexed young adult (20 -30 years of age) probable female, Sk (8598) (Figure 8.6), was interred with a neonate, Sk (8596), in a basket (8597) placed over the feet. The adult was lying on its right side, facing downwards (i.e. into the ground surface) with the main axis of the body in an east to west orientation, cephalic extremity to the east. The lower limbs were drawn up towards the thorax, which was rotated to the left, with the vertebral column and upper ribs thus exposed. The left arm was extended alongside the thorax and the elbow – placed between the legs - was very tightly flexed such that the radius and ulna were almost parallel with the humerus. The left hand was flexed on top of the right femur. The right arm lay under the thorax, the elbow tightly flexed with the wrist under the mandible and the

right hand bent back against the radius and ulna. An adult left ulna, femur and radius (likely from an earlier burial) surround this individual, having been apparently displaced to the sides of the pit to permit the interment of Sk (8598).

The bones of Sk (8598) are stained a red colour. Portable XRF analysis determined that the pigment has a high iron (Fe) content, indicating red ochre. It is unclear whether the pigment was applied directly to the body prior to burial or sprinkled on the body after placement in the grave.

Sk (19593), Building infill (19570)

Figure 8.7. Adolescent skeleton, Sk (19593), deposited into the infill (19570) of Space 87, Building 114.

Sk (19593) is a relatively complete and well-preserved subadult recovered from the infill (19570) of Sp.87, B.114 (Figure 8.7). Based on the development of the dentition, this individual was estimated to be approximately fifteen years of age (+/- 3 years) and assigned to the adolescent age category. The deposition category for Sk (19593) was considered to be primary disturbed due to the completeness of this individual and the articulation of the remains. However, Sk (19593) appeared to have been rather carelessly deposited with the building infill (19570), as opposed to having been properly buried, judging from the lack of a burial cut and the position of the body; in this sense, it is also possible to consider Sk (19593) as a tertiary deposit. The long axis of the body was oriented east-west with the head toward the west, and the body itself was prone/slightly tilted onto its left side. The cranium was absent, but the mandible was facing north/northwest. The right upper limb was medially rotated and extended with the hand toward the right knee, while both the right and left lower limbs were loosely flexed at the hip and knee. The left upper limb was not recovered as the 2012 season finished before it could be located and lifted. Presumably, the left upper limb is at a lower elevation than the rest of the skeleton and should be recovered when excavation resumes in this area next season. Although the cranium was absent, the mandible, hyoid, and one cervical vertebra were all present suggesting that the cephalic extremity was complete at the time of interment. Thus, Sk (19593) represents a possible case of cranial removal, though no cut for this event was apparent in the building infill (19570).

Sk (19588), Building infill (19570)

Sk (19588) is a poorly preserved adult cranium belonging to a possible male found upside down within the infill (19570) of Sp.87, B.114, against the western wall. Because it belongs to an adult, this cranium does not appear to belong to the subadult Sk (19593) found lower down within infill (19570).

Sk (20604), Building infill (19570)

Sk (20604) is represented by the articulated left and right feet (and a fragment of right distal fibula) of an adult. Due to their articulation, these elements were considered to be a primary disturbed deposition but could also be considered a tertiary deposit according to the same

criteria presented for Sk (19593) above. These isolated feet were found in the infill (19570) of Sp.87, B.114 near the subadult Sk (19593). The left foot was near the pelvis of Sk (19593) and was oriented north-south with the toes extending toward the south. The right foot was near the mandible of Sk (19593), in the area of the missing cranium, and was oriented northwest-southeast with the toes extending toward the northwest. No burial cut was delineated for either of these elements.

Space 336, Building 77

F.3642, Sk (19494), Cut (19495), Fill (19471), basket (20413)
F.3642 represents the burial of a neonate found under the floor near the north wall of B.77. The entire skeleton (19494) was covered by phytolith impressions and what appeared to be the charred remains of a reed basket or matting (20413). Such excellent preservation (due to the burning in B.77) is rare and, as such, a decision was made to block lift the entire burial, including grave fill, for closer examination in the lab. Initial samples of the organic material covering the skeleton were taken in conjunction with Philippa Ryan in the conservation lab, but the skeleton itself has not yet been fully excavated. Work on this burial will continue in 2013.

North Area Post-Neolithic burials

F.3631, Sk (19453), Cut (19477), Fill (19443)
F.3631 represents the primary disturbed burial of a subadult, Sk (19453), that was relatively complete but of poor preservation. Based on the stage of long bone epiphyseal fusion, this individual was assigned to the adolescent (12-20 years) age category. This individual was buried in a supine position, and the long axis of the body was oriented east-west with the head to the west. The upper limbs were extended along the sides of the body, and the lower limbs were also extended. The cranium and mandible were missing, and an animal burrow had disturbed a large part of the western portion of F.3631 in the area in which the head would have been located. According to the archaeologists, it is possible that the burial fill (19443) had been dug into at some point and the head retrieved from the grave, leaving a softer material into which an animal later burrowed. No cranial fragments were found in the disturbed area, indicating that by the time the animal disturbance occurred, the head was absent from the grave. The presence of several cervical vertebrae along with some teeth indicates, however, that this individual's cranium and mandible were present at the time of interment (Åsa Berggren, pers. comm.); this association will be investigated further in 2013. Several metal nails (19443.x1, 19443.x2) were found in the burial infill and were likely associated with a wooden coffin.

F.3632, Sk (19456), Cut (19473), Fill (19445)
F.3632 includes the primary burial of an adult, Sk (19456). This individual was assigned to the middle adult (30-40 years) age category based on the characteristics of the auricular surface of the ilium, and the sexually diagnostic features of the pelvis indicated this individual was male. Sk (19456) was buried in a supine position, and the long axis of the body was oriented east-west with the head towards to west. The right upper limb was extended along the side of the body, while the left upper limb was missing. Both the right and left lower limbs were also extended. A single metal nail was recovered from the burial infill (19445) suggesting that this individual was interred in a wooden coffin. Like other Late burials from the North Area, grayish mudbrick material was placed atop the burial after the coffin was placed in the ground, but Neolithic burnt

rubble from nearby Sp.1002 also formed much of the burial infill. A worked bone object (19445.x1), possibly a spindle, was found in association with Sk (19456).

F.3633, Sk (19454), Cut (19474), Fill (19446)
F.3633 represents the poorly preserved primary burial of a subadult approximately nine years old (+/-3 years), based on the development of the dentition. The body was oriented in an extended supine position with the head to the west. The upper limbs were extended alongside the body. The body does not appear to have been placed in a coffin as no iron nails or traces of wood were found. A small metal pendant (19446.x1) was found on the chest of this individual.

F.3640, Sk (20426), Cut (20462), Fills (19483), (19498)
F.3640 is a "false-bottom" mudbrick-lined primary burial containing a poorly preserved adult skeleton. The skeleton (20426) is highly fragmentary and missing most of the left forearm and hand. Due to the poor condition of the remains, sex could not be determined and adult age was based on all visible epiphyses being completely fused. The right forearm and part of the hand were *in situ* indicating that the forearm was pronated. The rest of the skeleton was supine in position, with the head located in the western part of the grave cut. The individual was probably buried in a coffin, as evidenced by iron nails found in the fill (19483, 19498). This burial had what is thought to be a grave good. An obsidian point (19498.x1) was found above the mud brick lining directly on top of the thorax of the skeleton. Possible phytoliths were heavily deposited on the dorsal surface of both feet, the anterior surface of the right ilium, as well as underneath both humeri. The left ribs had a black deposit on the visceral surfaces, the source of which is unknown.

F.3641, Sk (20402), Cut (20427), Fill (19478), Mudbricks (19487)
F.3641 is a "false-bottomed" mudbrick-lined primary burial containing the poorly preserved remains of a child Sk (20402) aged between 3 and 12 years of age. As no teeth were recovered, a more precise age estimate could not be provided. The body was placed in an extended supine position with the head oriented to the west. The skeleton was highly disturbed, with many bones missing or displaced; this is likely due to rodent activity and the proximity of the grave to the modern surface. The presence of a coffin was indicated by several iron nails found in the grave fill (19478). No grave goods were recovered.

F.3685, Sk (19569), Cut (20484), Fills (19568), (20480), (20485), Mudbrick (20499)

Figure 8.8. Post-Chalcolithic primary burial of a young adult female, Sk (19569) (F.3685).

F.3685 is a "false-bottomed" mudbrick-lined primary burial containing the complete, well-preserved skeleton of a young adult female, Sk (19569) (Figure 8.8). Age estimation was based on morphological changes in the pubic symphysis and auricular surface of the pelvis. Sex was determined using sexually dimorphic features of the pelvis and skull. The body was placed in an extended supine position with the head oriented to the west; the upper limbs were extended alongside the body. Iron nails and traces of wood indicate

the remnants of a coffin. The forearms, hands and feet were displaced as a result of rodent activity. One glass (19568.x11) and two ceramic (19568.x12, x13) *unguentaria* were placed at the head. Two carved bone pins (19568.x14, x17) and several bronze fragments were also recovered from the foot area. *Spina bifida occulta* is observable in the sacrum. Based on facial morphology, this individual appears to be of Sub-Saharan African ancestry, although further analysis is required before a definitive statement can be made.

F.3687, Sk (19577), Sk (20495), Cut (20494), Fill (20493)

Figure 8.9. Post-Chalcolithic double burial of a young adult probable male (Sk (19577); lower skeleton) and an older adult female (Sk (20495); upper skeleton) (F.3687).

F.3687 is an unusual primary burial containing two poorly preserved adult individuals placed on top of each another (Figure 8.9). Unlike other Late burials at Çatalhöyük, the bodies had been placed in an extended supine north-south alignment with the heads oriented to the south. The upper limbs of both individuals were extended alongside their bodies, with their hands placed on their hips. Iron nails and traces of wood found in the grave fill (20493) indicate that the two individuals were buried together within a single coffin. The lowermost individual (19577) is a young adult, possibly a male. The age of this individual was estimated by morphological changes in the pubic symphysis and auricular surface of the pelvis. Sex was determined using sexually dimorphic features of the pelvis and cranium. The second individual (20495) is an older adult female. The age of this individual was estimated by the observation of severe osteophytic lipping of the lumbar vertebrae. Sex was assessed using sexually dimorphic features of the cranium and the overall gracility of the skeleton. The female skeleton (20495) wore a bronze ring (20493.x2) with a small inset stone on the right hand. Two glass *unguentaria* (20493.x17, x18) were found at the south end of the grave near the heads; a ceramic *unguentarium* (20493.x13) and several flat bronze fragments were also found beside the left lower limbs of the skeletons. Additional bronze fragments were found near the feet. The poor preservation of the skeletal material is likely due to rodent activity and close proximity to the modern surface.

F.3689, Sk (19587), Cut (19573), Fills (19572), (19585), (19586), (20490)

Figure 8.10. Post-Chalcolithic primary burial of a young adult female, Sk (19587) (F.3689).

F.3689 is an east-west aligned primary burial containing the well-preserved skeleton of a young adult female, Sk (19587) (Figure 8.10). Age estimation was based on morphological changes in the pubic symphysis and auricular surface of the pelvis. Sex was determined using sexually dimorphic features of the pelvis and skull. The body was placed in an extended supine position with the head oriented to the west. The upper limbs were extended alongside the body with the hands pronated. Iron nails and traces of wood were found in the grave fill ((19586), (20490)) indicating the remnants of a coffin. A slender glass vessel (19586.x1) was placed next to the head, while an iron ring (19587.x3) was found on the left hand and bronze hoop earrings (19586.x2, 19587.x2) were found next to the temporal bones of the cranium. The crown of the mandibular left third molar has been obliterated by a large carious lesion.

South Area Neolithic burials

Space 379, Building 89

A single loose mandible (19829.x2) was recovered from a possible post-retrieval pit just west of the northern platform of B.89. The edentulous mandible belongs to an older adult female (based on the antemortem loss of dentition and morphology). Severe bilaterally expressed temporomandibular joint (TMJ) disease is evident on the mandibular condyles. The mandible preserves traces of red pigment (ochre?) on the body and rami. A thick piece of plaster also appears to cover what remains of the anterior dentition, but does not adhere to the bone itself. Perhaps this painted mandible originally formed part of an installation or was attached to a similarly decorated/plastered cranium.

Space 370, Building 96

Two burials were recovered from B.96, Sp.370 in 2012.

F.7001, Sk (19720), Cut (19721), Fill (19701)

F.7001 is a primary disturbed burial located in the central eastern platform (F.3508) of B.96. The burial contained an incomplete adult skeleton (19720) of indeterminate sex. The cephalic extremity, right upper limb, pelvis, lower limbs and feet are missing. Given the size of the grave cut (19721), the body appears to have been placed in a tightly flexed position either on its back or slightly on its left side. The axis of the body is aligned east-west, with the head oriented to the west. The left upper limb was tightly flexed alongside the body with the hand on the left shoulder. An assessment of sex and a more precise estimation of age for this individual cannot be provided due to the absence of the *ossa coxae*, cranium and dentition. The body has been disturbed at some point after burial but not, apparently, by a subsequent interment. Perhaps the cranium, mandible and other body parts were intentionally removed as part of a secondary

mortuary ritual. The lack of small, loose skeletal elements such as foot bones in the grave fill (19701) suggest the burial was disturbed while the body was at least partially fleshed and still held together by soft tissue.

F.7002, Sk (19727), Cut (19728), Fill (19724), reed basket/mat (19726)

Figure 8.11. Primary burial of a child, Sk (19727), excavated from Space 370, Building 96 (F.7002).

F.7002 is a primary burial located in the northeast platform (F.3507) of B.96 (Figure 8.11). The burial contained the complete skeleton (19727) of a child approximately three years of age (+/- 1 year) based on dental development and eruption. Traces of phytoliths (19726) above and underneath the skeleton suggest the body was bundled inside a reed mat or basket. The body was placed in a flexed position on its left side. The head was oriented to the west and facing north. The right upper limb was tightly flexed on top of the thorax at less than a 45º angle. The left upper limb was underneath the body with the forearm extended slightly away from the body and the hand underneath the chin. Both lower limbs were tightly flexed against the abdomen, with the right crossed over the left. Several fragments of shell were found in the grave fill and one large piece was found just above the frontal bone of the cranium.

Space 365, Building 97

Four burials were recovered from B.97, Sp.365 in 2012. These continue the sequence of interments found under the northwest platform (F.3459) in 2011.

F.3548, Sk (20340), Cut (20338), Fill (20339)

Figure 8.12. Primary disturbed burial of a child, Sk (20340), excavated from Space 365, Building 97 (F.3548).

F.3548 is a primary disturbed burial located within in the center of platform F.3459 (Figure 8.12). The burial contained the skeleton of a child (20340) approximately eight years (+/- 2 years) of age. Estimation of age for this individual is based on dental development and eruption. The body was placed in a tightly flexed position on its right side with the head to the east and the feet to the west. The head was tightly flexed against the chest such that it faced west. The lower limbs were tightly flexed against the abdomen to the north of the body. The right upper limb was tightly flexed against the chest with the hand touching the face.

The left upper limb was flexed at approximately a 90º angle with the hand between the knees. The burial has been disturbed at the feet (west) by a later burial (F.3522) excavated in 2011. The left foot is missing as a result of this disturbance.

F.3552, Sk (20351), Cut (20349), Fill (20350)

Figure 8.14. Primary burial of a late adolescent possible female, Sk (20351), excavated from Space 365, Building 97 (F.3552).

F.3552 is a primary burial of a late adolescent possible female found in a flexed position on its right side (Figure 8.13). Age assessment was based on dental development. Sex assessment was based on cranial morphology only; the bones of the pelvis were too poorly preserved to be of use. The long axis of the body was oriented east-west, with the head to the west and facing south. The upper left limb lay along the torso with the elbow flexed at approximately 45º and the forearm across the abdomen. The right upper limb was similarly oriented. Both lower limbs were flexed at the knee with the thighs pressed against the torso. The eastern edge of the grave cut (20349) had disturbed an earlier burial (F.3555), resulting in the disarticulated left leg (tibia and fibula) and foot of this earlier individual, Sk (20374), being found in the grave fill (20350) of F.3552.

Figure 8.13. Primary disturbed burial of a middle adult probable male, Sk (20374), excavated from Space 365, Building 97 (F.3555).

F.3555, Sk (20374), Cut (20372), Fill (20373)

F.3555 represents the primary disturbed burial of an adult, Sk (20374), that was relatively complete and in good condition (Figure 8.14). Based on the characteristics of the pubic symphysis and the auricular surface of the ilium, this individual was assigned to the middle adult (30-40 years) age category. Sexually diagnostic characteristics of the cranium and pelvis led to a sex determination of probable male. The long axis of the burial was oriented north-south with the

head to the south. The head, upper limbs, and torso were supine such that the face was skyward, while the lower limbs were rotated at the hip and lying on their left side. The right upper limb was tightly flexed at the elbow with the hand toward the chin, and the left upper limb was more loosely flexed at the elbow with the hand extended onto the chest. Both the right and left lower limbs were tightly flexed at the hip and knee with the knees drawn toward the chest. F.3555 was truncated along the northwest edge by the grave cut (20349) of F.3548, such that the left tibia, fibula and foot bones of Sk (20374) were recovered from the burial infill (20350). During lab processing, Sk (20374) was related to these disarticulated remains (20350.B1) and the skeletal inventory and database adjusted accordingly.

F.3557, Sk (20377), Cut (20378), Fill (20376)

Figure 8.15. Primary burial of a young adult probable female, Sk (20377), excavated from Space 365, Building 97 (F.3557).

F.3557 represents the primary burial of a young adult (possibly female) (Figure 8.15). The body was placed on its back with both lower limbs drawn up, knees together, and loosely flexed to the right of the body. The long axis of the body runs north-south, with the head oriented to the south and facing up. The left upper limb was parallel with the torso and flexed 90º at the elbow, with the forearm across the abdomen. The right upper limb was abducted approximately 45º from the torso, with the elbow flexed at roughly 90º and the forearm across the abdomen. The left and right wrists crossed above the right hip. The cut for this burial appears to have truncated an earlier burial in this area excavated in 2011.

F.3553, Sk (20367), (same as 18635)

F.3553 represents the right foot of a child found in the southeast corner of B.97. The articulated left leg (tibia and fibula) and foot of this individual was recovered in 2011 and assigned to F.3520, Sk (18635). The rest of this individual will be excavated in 2013.

TPC Area Neolithic burials

F.3961, Sk (20162), Cut (20257), Fill (20161)

F.3961 contains the primary burial of an adult male, Sk (20162) (Figure 8.16). Sk (20162) was tightly flexed and prone, oriented northwest-southeast with the head in the northwest. The lower body was on its left side, while the upper body was resting chest (and face) down. The body would have been slightly twisted at the lower back when placed into the cut for this position. The head was flexed with the face to the east. The right upper limb was moderately flexed at the elbow (45˚), with the forearm pronated and beneath where the abdomen would

Figure 8.16. Primary burial of an adult male, Sk (20162) (F.3961).

have been. The right hand was underneath the chest palm down. The left upper limb was slightly flexed at the elbow, with the forearm pronated and the hand curled slightly around the left posterior iliac crest. The left femur was slightly displaced from the acetabulum and the distal shaft was missing or eroded away, but was lying on its lateral surface. The condition of the remains was fair to poor, since the individual was located very close to the modern surface. Sk (20162) was the last burial event of this sequence of burials contained in F.3961 and F.3931, where a separate cut (20257) must have been made to place this individual here on top of F.3931. The cut (20257) was unclear due to the location close to the surface. Sk (20162) was buried on top of an earlier individual Sk (20166) in such a way that this cut (20257) disturbed only the cranium of Sk (20166) in F.3931. Sk (20162) was missing elements that probably degraded completely, such as the right leg and foot.

F.3931, Sk (20166), (20208) and (20217), Cut (20258), Fill (20161)

Figure 8.17. Primary burial of a middle adult female, Sk (20166), along with the disarticulated remains of two additional individuals (F.3931).

F.3931 contains the primary burial of a middle aged adult female, Sk (20166), along with the partially disarticulated remains of two individuals (Sk (20208) and (20217)) (Figure 8.17). Therefore, Sk (20166) is a later event than Sk (20208) and Sk (20217). It is unclear which (if either) individual was buried here first (Sk (20208) or Sk (20217)); it may be that they were buried at the same time. Sk (20217) and (20208) were placed in F.3931 first and allowed to partially decompose before F.3931 was reopened to bury Sk (20166). Sk (20217) and (20208) were pushed to the edges of the cut (20258) to make room for the primary burial of Sk (20166). Sk (20166) was later disturbed by F.3961 Sk (20162), which struck and damaged the cranium of Sk (20166).

Sk (20166) was oriented east-west, with head in the west. The lower body was placed on its left side, while the upper body was supine. The face was towards the north, with the superior surface of the cranium towards the top of the burial. The right upper limb was flexed 90˚ at the

elbow. The forearm was pronated with the hand on top of the right knee where the fingers wrapped around the distal end of the femur. The left upper limb was tightly flexed at the elbow. The forearm was pronated with the hand next to the head with the palm to the face. The right lower limb was tightly flexed, and the foot was disturbed. The left lower limb was also tightly flexed, and the foot was dorsiflexed with the toes pointing upwards. Age was determined based on the auricular surface, and sex was determined based on pelvic morphology. Some reactive bone was observed on the auricular surface, which may be suggestive of increased mobility of the joint in life. A stature estimate of 154.5 cm for this individual was based on a maximum fibula length of 32.4 cm.

Sk (20208) is the primary disturbed burial of a middle-aged adult female. Sk (20208) was disarticulated at the hips, ankles, and shoulders. The majority of the thorax was scattered throughout the fill (20161). The major elements such as the lower limbs, upper limbs, cranium and mandible, and *ossa coxae* were pushed to the edges of the cut (20258) with the exception of the left upper limb. The left upper limb was mostly articulated and placed on top of Sk (20166) over the thorax. The left upper limb was flexed at 90˚ at the elbow and the hand was absent, but would have been abutting the cranium of Sk (20166) (posterior). The head was in the western edge of the cut (20258) facing north with the superior surface of the cranium up. The cranium was in very close proximity to the cranium of Sk (20166). The right upper limb was in the southeast corner of the cut (20258), with the hand mostly disturbed, except for the phalanges that were in anatomical position with the palmar surface up (fingers pointing south). The right forearm was disarticulated from the humerus, but still had some carpals articulated at the wrist joint. The right lower limb was tightly flexed in the southeast corner and had been removed from the acetabulum, but was articulated at the knee (patella present). The left lower limb was tightly flexed in the southern edge of the cut (20258) and was also not articulated at the acetabulum but articulated at the knee (with patella). Many of these elements as well as the scattered disarticulated remains of Sk (20208) were either directly or partially on top of Sk (20166), indicating that the majority of Sk (20208) was taken completely out of the burial to make room for Sk (20166) and then placed back in as well as pushed to the edges of the cut (20258). Both feet of Sk (20208) are missing, which may have to do with the limbs being fully removed from the burial. Age was determined based on the pubic symphysis, and sex was determined based on pelvic and skull morphology. A stature estimate of 163 cm for this individual was based on a maximum radial length of 22.8 cm.

Sk (20217) is the primary disturbed burial of a subadult. The remains of this individual were scattered throughout the grave fill (20161), where elements were found above and at the same level as Sk (20166). This indicates the same type of removal as Sk (20208), where Sk (20217) was completely removed from the burial to make room for Sk (20166) and then the disarticulated elements of Sk (20217) were placed back into the burial on top of Sk (20166) and to the edge of the cut (20258) at the same time as Sk (20208) was placed back into the burial. The majority of Sk (20217) was disarticulated, where one leg (tibia and fibula) were still in articulation underneath the cranium. Much of this individual was missing; only some small bones were in the fill (20161). The cranium, right femur, both tibiae, and right fibula were the only larger elements present. The cranium was against the northwest edge of the cut (20258), upside down and crushed. Based on dental development and epiphyseal closure, this individual was approximately six years old at the time of death.

TPC Area Post-Neolithic burials

F.3202, Sk (20119), Cut (20112), Fill (20111), Mudbrick grave walls (20112)

F.3202 is a primary disturbed extended supine burial of an adult Sk (20119). The entire upper body (including the pelvis) was disturbed by a later event. Many of the bones were re-deposited in the fill (20111). The lower limbs were *in situ*, with the feet in the eastern part of the grave with a clear cut and mudbrick walls (20112). The burial was oriented E-W, where the head would have been in the west. The lower limbs and feet were slightly on their right sides (pointing south). This burial most likely dates to the Islamic period of the cemetery. The condition of the remains is very poor; no sex or specific age could be assigned besides the individual being an adult.

F.3900, Sk (20121), Cut (20131), Fill (20106), Mudbrick grave walls (20107)

Figure 8.18. Post-Chalcolithic primary burial of an adult male, Sk (20121) (F.3900).

F.3900 is a primary burial of an adult male, Sk (20121), in good condition (Figure 8.18). The body was fully extended and supine, with the head in the west and feet to the east. The individual was lying slightly on the right side (south), as well as the head placed on the right side (face pointing south). The right upper limb was flexed at the elbow with the forearm flexed 90˚, where the hand and forearm were resting upon the southern mudbrick wall (20107) oriented upwards. The left upper limb was flexed at the elbow with the forearm crossed over the pelvis. The forearm was pronated, with the left hand placed palm down over the right *os coxae*. Both lower limbs were fully extended and parallel to each other. The right foot was resting on the right side, and the left foot was positioned with the toes pointing up. This burial most likely dates to the Islamic period. Sex was determined by skull (cranium and mandible) morphology to be a male. Age could not be more precise than the adult category.

F.3901, Sk (20120), Cut (20132), Fill (20109), Mudbrick grave walls (20110)

F.3901 is a primary disturbed extended supine burial of an early adolescent, Sk (20120). Most of the upper body was disturbed and scattered in the grave fill (20109). The cut of the grave was clear (20132) as well as the mudbrick wall construction (20110). Once the base of the burial was reached, the lower limbs and scapulae were found to be *in situ*, where the feet were in the eastern part of the grave. The burial was oriented east-west, with the head to the west. The condition of the remains is fair to poor. Based on epiphyseal closure, Sk (20120) was between the ages of 12 and 14 years at the time of death. As such, sex could not be reliably assigned.

F.3905, Sk (20103), Cut 20102(), Fill (20101)
F.3905 is a primary burial of an adult male, Sk (20103). The burial was truncated by Mellaart's 1960s excavation trench at the western section of the grave, leaving the cranium exposed to the processes of erosive. The body was fully extended and supine, with the head in the western part of the grave and feet to the east. There was no burial construction, though the cut was clear and deliberately made right up against a Neolithic wall (south "wall" of burial). The skeleton was in very good condition, and placed on the individual's right side, facing south. The upper limbs were slightly flexed at the elbow, where the left forearm was pronated and left hand was extended. The lower limbs were extended and parallel to each other, the left tibia was disturbed and displaced superiorly and medially. The left foot was placed on top of the right foot, where the right foot was plantar-flexed. Sex determination was based on the pelvic morphology. Age assessment was based on the auricular surface, providing an estimate of 45 to 59 years of age. An orange deposit was found next to the right side of the abdomen, and a sample was taken for analysis.

F.3916, Sk (20136), Cut (20137), Fill (20135)
F.3916 is a primary disturbed extended burial of a subadult, Sk (20136). The disturbances appear to be from animal activity, where burrows were apparent during excavation through the grave fill (20135). The elements that were still *in situ* suggest that this burial dates to the Islamic period, where the face is oriented to the south (head on right side). The body was extended supine with the head in the west and feet in the east of the grave. Both humeri were extended alongside the body, and the remainder of the upper limb was disturbed. Both lower limbs were slightly flexed at the knee, and placed slightly on the right side. The majority of the foot bones were missing. Based on dental development and epiphyseal closure, Sk (20136) was approximately four years old.

F.3930, Sk (20158), Cut (20157), Fill (20159)
F.3930 is a primary disturbed extended burial of a subadult, Sk (20158). This burial was truncated by Mellaart's trench; the entire upper body is thus absent. The head would have been in the west, and the feet were in the east. The lower limbs, right hand, and isolated bones from the left hand, sacrum, and *os coxae* were recovered. The right hand was *in situ*, and was at the side of the body at hip level. The hand was positioned with the palm down, suggesting the forearm was pronated. This burial is most likely from the Islamic/Selçuk period, where the orientation of the right lower limb is positioned on its lateral (right) side facing south. The right foot was dorsiflexed. The left lower limb was extended, and the left foot was on its right side with the toes pointing south. Sk (20158) was between five and six years of age based on epiphyseal closure.

F.3932, Sk (20193), Cut (20186), Fill (20168)
F.3932 is an incomplete, primary disturbed extended burial found in the southwest corner of TPC Trench 2. Only the legs (i.e. tibiae and fibulae) and feet were found *in situ.* Based on the position of the lower legs and feet, the body was oriented with the head to the west. Rib fragments, a left humerus and scapula along with the femora were recovered loose in the fill (20168). Based on the state of epiphyseal union, the bones belong to an adult individual; sex could not be determined, however. The bones were in poor condition. No grave goods or traces of a coffin were found.

F.3938, Sk (not assigned), Cut (20188), Fill (20187)

F.3938 is a highly disturbed, incomplete burial found in the southern part of TPC Trench 2. The surviving skeletal elements consist of a right *os coxae* and sacrum, as well as rib, vertebral and long bone fragments; all were found in the eastern end of the grave cut. Based on the state of epiphyseal union, the bones belong to an adult individual of indeterminate sex. The bones were in poor condition. Given the size and orientation of the grave cut, it is likely the body was originally placed in an extended position with the head oriented to the west. No grave goods or traces of a coffin were found.

9. Faunal Remains, 2012

Julia Best(1), Arzu Demirergi(2), Jennifer Jones(1), David Orton(3), Jacqui Mulville(1), Kamilla Pawłowska(4), Adrienne Powell(1), Kathryn Twiss(2), Jessie Wolfhagen(2)

(1)Cardiff University, (2)Stonybrook, (3)MacDonald Institute, Cambridge University, (4)Adam Mickiewicz University

Introduction

Over the next tranche of excavations and study seasons some of the major excavation aims are to obtain a comprehensive series of radiocarbon dates and provide secure chronological contexts for the Hodder levels; to link the various excavated areas together (e.g. the Team Poznan trenches to the South area on the East Mound); and to extend the spatial and chronological extent of the site. This will be achieved by further exploring the earliest activity on the East Mound in the South area and by extending excavations in the North.

The start of this new campaign also saw changes in the composition of the Çatalhöyük faunal team. As a result much time and energy was devoted to familiarising the new team members with the material, methods and previous results. With in excess of one million fragments already recovered and comprehensively reported, this season also focused on a review of the research aims and objectives of the faunal analysis. Extensive discussion and debate both within the faunal team and the wider project team helped in the development of new research agendas and strategies.

As 2012 was an excavation season, work was divided between keeping pace with the East Mound excavations in the South, North and TPC areas and recording material from previous excavation seasons. In addition, material from the ongoing excavation in Trench 5 on the West Mound continued to be recorded.

As part of our review process the further research potential of material from earlier excavation campaigns was considered. This resulted in a collaborative project with the Human Remains team to assess the potential of unrecorded osteological material from the Konya Basin Palaeoenvironment project (KOPAL).

In summary the aims for 2012 were

1. to initiate recording of newly generated excavated material from the East Mound
2. to complete full recording of all deposits (including primary and subsequent deposits) associated with East Mound buildings excavated since the previous team ceased recording new data (primarily 2009 onward)
3. to focus on recording of the material from Building 98 West Mound
4. to provide feedback for priority units
5. to provide samples for radiocarbon dating (see below; also Bayliss, this report)
6. to provide samples for ancient DNA analysis (see below; also WHOMEVER, this report).
7. to assess the potential for completing the analysis of the osteological material from KOPAL.

Results

A review and revision of current methodologies was undertaken. During the eight week season (adding up to a total of 34 individual working weeks) the faunal team fully recorded around 50,000 identifiable specimens (NISP), or about 1300 Diagnostic Zones (DZ) and assessed 3 crates of material from KOPAL. Recording of a substantial range of buildings excavated in previous years was completed. This year with the opening of the North area in the East Mound in 2012, material from six different areas was considered. A large proportion (30%) of the 2012 newly excavated material was recorded. The highest proportion (50%) of new material was recorded from the South area in the East Mound, with 35% of North bone, 20% of TPC and 14% from the West analysed. Sampling for aDNA and RC dating was also completed.

2012 Faunal database revisions

In 2012, we edited our data recording system with the aims of a) speeding up our pace of recording, so that we can provide quantitative as well as qualitative descriptions of a greater proportion of the site's fauna; b) providing new options for assemblage quantification; and c) enhancing quick unit overviews. Our modifications have (thus far) involved the Faunal Unit Description, which summarizes the fauna from each archaeological context, the Basic Faunal Data, which quantitatively records individual or grouped specimens within each context, and the Cranial Table, which characterizes the elements present in cranial specimens. Units recorded with the new system are listed in the site database as having undergone Tier 1 recording. Specific modifications are as follows:

1. Revisions to the Faunal Unit Description: we continue recording a text description of each unit, but we also now add a series of quantitative estimates summarizing unit contents. For each unit we record the proportion (by NISP and by weight) of specimens derived from cattle-sized animals; sheep-sized animals; and other-sized animals. ("Cattle-sized" includes large equids and red deer; "Sheep-sized" includes medium canids/dogs, small cervids; "Other" includes all other taxa, eg hare and fox sized specimens; birds; wild boar; small-medium equids.) We also estimate the proportion of the unit that is burned, the proportion gnawed, and the modal surface condition (Good; Normal; Heavy; Variable).
    a. For units that otherwise wouldn't get studied (eg tertiary deposits), we will record diagnostic specimens and those of other notable interest (eg, specimens with working or butchery traces). We will not sort the rest of the unit as far as size class, but will weigh the remaining specimens all together. Such units will be recorded on the FUD as having received A5 analysis. Size-class weight totals on A5 FUDs will exclude the unanalyzed material.
2. Revisions to the Basic Faunal Data table: our primary alteration to standard faunal recording is the addition of a zone system of quantification, which we are now using instead of verbal descriptions of element portion(s) present. These zones are defined following Serjeantson (1991) and should not be confused with the Diagnostic Zones (DZ) *sensu* Watson (1979) which have been retained in order to facilitate comparison with previously recorded data. The number of elements method of quantification has been discontinued. We have added Proximal Fusion and Distal Fusion to our BFD worksheet, which in combination with the Zones minimizes the number of specimens that require entries on the Postcranial Table.
    a. We have cut the number of elements that require individual BFD records, grouping some of them into broader categories that enable grouped records.

Thus, for example, all carpals and tarsals except C2+3, naviculocuboid, astragalus, and calcaneus are now recorded under the collective heading "carpal/tarsal;" bovid conspecific loose upper teeth share a single record even if multiple elements are present (e.g., P4 and M1).

b. Individual specimens are not weighed in Tier 1 recording; we rely on the size-class-specific weights on the FUD to summarize the weight of bone in each unit.
c. All types of scrap are grouped by size: thus vertebrae, ribs, and long bone shaft splinters are all grouped together. For each such group we divide the specimens into burned (for scrap, all types of burning—carbonized, calcined, etc-- are grouped together) and unburned groups, and record them separately.

Revisions to the Cranial table: We now use 2, 3, 4 to number deciduous premolars, rather than 1, 2, 3. We no longer record interparietal, lacrimal, nasal, pterygoid, vomer, basioccipital, sphenoid, temporal, and palatine fragments separately, but group them under the general heading of Cranial Scrap. We use Zones (on the BFD) to record mandibular portions, rather than verbal portion descriptions on the Cranial table.

Assessing the impact of the modifications to the recording methodology is difficult to quantify as yet. However, once the team had become familiarised with the revisions, the general impression was that recording had indeed become faster.

Faunal Analysis

Overview by Area and Phase

The distribution of recorded material (both NISP and DZ) by area (where available) is shown in Tables 9.1 and 9.2. The East Mound accounted for 97% of material recorded with the South area producing around 77%, the North a further 15% and TP/TPC 4%. About 3% of specimens recorded derived from the West Mound, all from Trench 5.

Table 9.1. Distribution of faunal material by area

Mound	Area	NISP	DZ
East	South	38929	725.3
East	North	7775	81.6
East	TP	77	12.1
East	TPC	1910	209.9
West	Trench 5	1633	241

Of the material assigned to a Hodder Phase, 60% overall derived from South.O, 13% from South.M with 6% assigned to South.G (Table 9.2). All other levels contributed less than 3% each, with the small TP assemblage recorded from previous years derived from phases TP.N and TP.O. The material excavated in TPC 2012 is as yet unassigned. The assemblage from Trench 5 derived from Chalcolithic levels.

Area	Level	NISP	DZ
South	L	3	0
	M	1090	56
	N	32	1
	O	29880	467.2
	P	6332	145.1
	Q	9	0.5
	R	3	0
	T	8	5
North	?G	2824	31.2
TP	N	67	11.1
	O	10	1
Trench 5	Chalcolithic	1312	197.5

Table 9.2. Distribution of faunal material by phase

Species/Size abundance

Material within the assemblage was assigned to 49 different identification classes (excluding some broad size categories). Overall the recorded assemblage was dominated by caprids (Sheep and Goat and Sheep-sized) for both the NISP and DZ quantification with a substantial proportion of bovid species (and Cattle-size) (Table 9.4). Other notable classes of material include cervids (deer), equids (horses), suids (pigs) and canids (dogs and foxes). A few bones of bear, ?large felid, badger, hare, mole and hedgehog were also noted as well as snake, turtle, frog and gerbil. All species with the exception of the mole (Talpa europaea) have been previously recorded, although bear and large felids are extremely rare with only one other example of each encountered in previous years.

A range of articulated and disarticulated human remains, including an infant cremation, were also identified, and many derived from infill/midden layers.

The 2012 database contains a total of 993 measurement records and 596 dental records. The majority of these data derive from caprids, and the evidence available to examine changes in bovid size and age structure over the site history remains extremely limited. It is imperative to gather more metrical and aging data for the rare species to extend analyses of their social and economic roles. Future research will target enhancing these datasets.

	Measurements	Dental Wear
Caprid	731	311
Bovid	140	127
Cervid	10	23
Suid	17	24
Equid	39	51
Canid	15	
Vulpid	26	

Table 9.3. Number of records with metric or dental aging data

Taxon	NISP	DZ
Ovis	648	416.5
Capra	149	76.5
Ovis/Capra	3102	477.5
Ovis/Capra/Capreolus	26	5
Sheep-size	14894	3
Bos primigenius	92	10
Bos sp.	2242	155.5
Bos Taurus	3	0
Cattle-size	7328	4
Large bovid	2	0
Equus caballus	3	0
Equus hydruntinus	3	0
Equus sp.	85	19
Large equid	18	7
Small-medium equid	68	19
Cervus elaphus	34	4.5
Large cervid	55	2
Small cervid	4	0
Dama dama	1	0
Capreolus capreolus	2	1
Sus scrofa	82	13.2
Pig-size	47	1
Canis familiaris	26	5.8
Canis sp.	47	7.2
Small canid	23	2.2
Medium canid	13	3.2
Medium carnivore	2	0
Small carnivore	19	1
Ursus	1	0.2
Large Felid	1	0
Vulpes vulpes	45	10.6
Vulpes sp.	10	0.4
Meles meles	4	2.2
Lepus	13	6.2
Hare-size	89	0
Lagomorpha	1	0
Erinaceus europaeus	2	1
Gerbilinae	1	1
Talpa europaea	1	0
Microfauna	4	0
Snake	1	0
Rodent	7	6
Frog	1	0
Turtle	5	0
Amphibian	13	0
Grus grus	1	0
Bird	139	7
Fish	8	0
Homo	86	na
Total	29451	1270.9

Table 9.4. NISP for each identification category

East Mound

South Area

The largest assemblage was recorded from the South. A total of 175 units were recorded. These derived from 25 spaces within which were ten individual buildings. As noted above, the majority of the assemblage, both in this area and overall, came from South. O (Table 9.5).

South	NISP	DZ
L	3	
M	1092	56
N	32	1
O	29889	467.2
P	6335	145.1
Q	9	0.5
R	3	
T	8	5
Unassigned	1573	50.5
Total	38944	725.3

Table 9.5. NISP and DZ by phase

Results from the South area in 2012 have been incorporated with those from previous years to compare the relative abundance of main species groups i.e. caprid, bovid, equid, cervid, suid and canid (domestic and wild). There is a large increase in the amount of material from Level O, 95% of which was recorded in 2012.

The predominance of caprids throughout the history of the site can be clearly seen in Figure 9.1. There are a few phases where bovids proportions increase, in particular South.O where bovids are nearly as common as caprids. This predominance is highly usual in these earlier levels, and the other two levels with enhanced levels of cattle have small sample sizes (H and J).

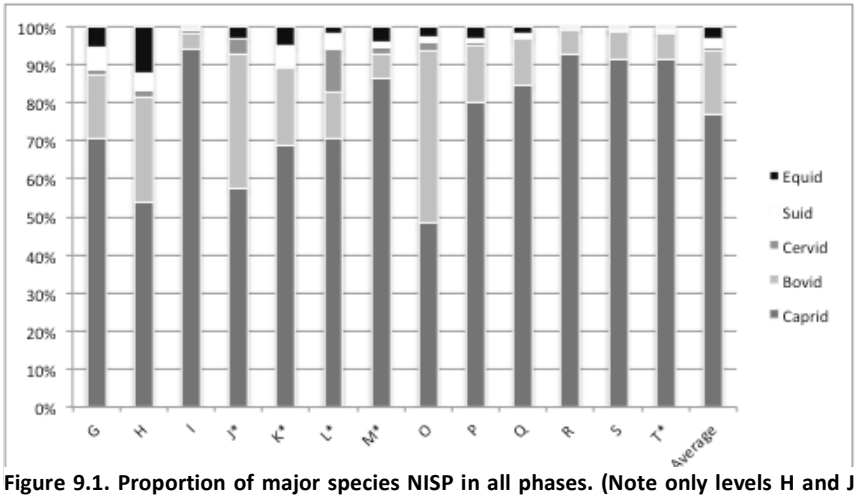

Figure 9.1. Proportion of major species NISP in all phases. (Note only levels H and J have a NISP less than 300.) * indicates a level containing provisionally assigned chronological data.

South.O fauna mostly derives from buildings and four of these provided the majority of the data: Buildings 79, 80, 96 and 97 (Table 9.6).

Building/Level	T	Q	O	N	P	R	M	L	UA	Total
104							109			109
370					74					74
76			909							909
76, 80			1304							1304
76, 96			3							3
79			7751							7751
80			13953							13953
86									403	403
89				32						32
96			3697						1158	4855
97			2272							2272

Table 9.6. NISP for Buildings by Hodder Phase. UA is material as yet unassigned to a Level.

Level O Buildings 76, 80, 96 and 97

The relative abundance of species within the four main buildings of Level O can be compared using diagnostic zones (DZ). Results demonstrate that for domestic sheep/goat DZ are generally most numerous.

The number and body part distribution of the main food species within these four buildings has been further investigated using the zone system (see below/above). This technique takes account of more fragmented material than does the DZ technique, as it has up to 8 zones per element rather than the maximum of 2 DZs. Estimations of the Minimum Number of Individuals (MNI), calculated from the Minimum Number of Elements (MNE), confirms that there are up to four times as many caprines present as bovids in these buildings. There are two equids represented in Building 80 whilst the other buildings have only one individual present. Suids are less numerous with few bones (MNI =1 per structure), recovered from each building. Cervids remains are also rare, with few overall and a maximum of one per house.

Building	Sheep/Goat	Bovid	Equid	Suid	Cervid
79	7	2	1	1	1
80	18	7	2	1	1
96	21	6	3	1	1
97	10	7	1	1	1

Table 9.7. Minimum Number of Individuals in four Buildings from Hodder South.O.

Despite the numerical abundance of caprines, the proportion of cattle, the small numbers of equids and the rare incidences of wild boar (and cervids) indicate that hunted animals were providing the majority of food within these mixed deposits. In particular Building 97 stands out as containing the largest proportion of bovids present (in both DZ and MNI). Whilst this assemblage is relatively small it is of a similar size to Building 79, which has a higher proportion of caprines.

The differences in the relative abundance in species within Level O, mostly recorded this year, and material from other levels analysed in previous years may be a product on the focus on

houses and a bias towards particular types of units. The majority of material derived from infill/midden layers. The strategy of using detailed recording for primary, secondary and tertiary deposits will have altered species proportion. (The comparison of different buildings' taxonomic proportions in Russell et al. [in press: Figs. 75, 76] includes only primary deposits.) Future analyses will compare the characteristics of the primary, infill and midden layers in more detail and look at differential discard patterns of species pre-, peri- and post-house use.

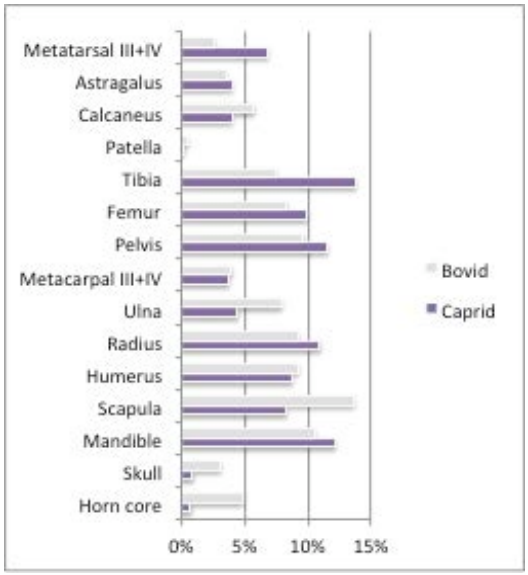

Figure 9.2. Distribution of bovid and caprid body parts

The distribution of major body elements (excluding vertebrae, ribs and phalanges) was calculated for the major species, caprids and bovids, in the four buildings (Figure 9.2).

It can be seen that a range of body parts was present for both species. The major differences between the two groups are the higher number of skull, horncore and scapula elements for bovids and the larger number of caprid metapodia and tibia (commonly the most abundant caprid element).

For bovids observations made during recording indicate that the proportion of horncores and skulls is probably an underestimate, due to the high degree of fragmentation these large elements suffer (Twiss & Russell 2009). Future work will focus on improving techniques to estimate their abundance.

The abundance of scapula can be compare with an unusual deposit previously excavated in the South (BACH, Space 86, unit 2296) nick-named the 'scapularium' (Russell and Martin 1998). A cluster of eight almost complete cattle scapulae (5 right and 3 left sides), fragments of skull/horncores and a a wild boar maxilla were recovered. One of the scapula spines was intentionally removed, and one glenoid cavity (articular end) worn on all sides, as if from use, suggestive of their use as tools. Many of the scapula recorded this year showed spine removal and wear related to their utilisation as plasters 'trowels' or 'shovels'. Similar scapula tools have also been recovered from the North Houses 1 and 5 and Building 74, TP (Marciniak, A. Czerniak, L. (2007).

These incidences of a high abundance of skulls and scapula can be interpreted as either a mixture of installation elements (i.e. horn cores and skull fragments that may have been inserted into the architecture) or tools/raw material for tool manufacture (scapulae). Skull and horncores are well known for their use within installations and future analysis will investigate if they are over represented in primary deposits or are equally prevalent in midden/infil layers.

Within these Buildings the rare species are dominated by canids and in particular foxes. There is a MNI of a single individual within each Building, apart from Building 96, which has the mandibles from two animals. Building 80 contained the partial burial of a small dog, with the femur, pelvis and vertebra recovered. Other minor species include the bear and large felid as noted above.

The possible large felid metapodia was contained within a large dump layer in Building 80 (South.O) and showed evidence of skinning in the form of transverse cut marks. The hare remains derived from an articulating right forelimb found in the gap between Building 80's west wall (F.5036) and Building 76's east wall (F.3401). The turtle remains (plastron) were contained within burnt layers in building 79 and 80.

Building 79

In burnt building collapse within the southern end was a large fragment of Bos horncore (X2), measuring 29x7cm in the ground.

Unit (17383), described as room fill, contained a cluster of minimally processed bones and articulated elements within this unit are indicative of secondary, rather than tertiary deposits. The most interesting find was an aurochs scapula fragment with pieces of obsidian embedded in the blade. There is evidence of healing that suggests this animal survived its injury for some time, and only later succumbed to human hunters.

Between Building 76 and 80

Unit (19814) is wall fill B.80 and B.76 is a sample associated with the remains of a puppy found between these two buildings; the hand-collected material has not yet been analysed. There is a cluster of canid axial elements and other bone (probably not from the canid) recorded. The analysis of this unit will be completed in 2013.

Unit (19818) lay between B.80's west wall (f.5036) and B.76's east wall (f.3401) and contained a range of inclusions including of ground stone, a variety of animal bones, obsidian and charcoal. Faunal remains included an articulating aurochs forelimb in addition to various sheep/goat, equid and fox elements. The aurochs remains consist of two articulating mandibles and a distal humerus, and (fragmented) proximal radius and ulna. There is also a worked sheep tibia that has the distal articular facet intact, possibly as a handle.

Building 80

A brick wall collapse, unit (18531), contained the remains of a Bos skull (the occipital. frontal and a range of fragment - X1, 3 and 2 respectively). Other skull/horncore finds include 18560.X1 frontal/horncore have derived from a possible robbed or removed moulding on the north wall. Finds18561.X2 a frontal/horncore,18576.X1 three different fragments of skull/ horncore and18580.X2 skull fragment/horncore all derive from wall/roof collapse with 18933.X2 a fragmentary horncore and 18933.X5 pelvis within roof collapse. Pillar fill unit (18940) contained two caprine metapodia (X4 and X5). The dump layer 18941 contained a Bos astragalus (X3) and caprine horncore fragments (X5). Unit 18955 was a stone and bone collection with two X finds a pathological bovid rib (X3) and a red deer antler (X2).

Unit (18519) a mixed room fill comprised of some heavily burnt, calcined and unburnt material. The former included a partial infant burial with associated calcined ‘shroud’ bone pin (probably sheep/goat tibia). The presence of articulating human remains with other unburnt material suggests a complex depositional history, possibly with the infant disposed off within the house infill.

Unit (18531) a brick wall collapse contained a number of Bos (probably aurochs) head and neck elements, including the frontal, skull fragments and axis. This has not been interpreted as a wall features as neck elements are normally absent. Other material is indicative of a mixed deposit.

Unit (18964) a burnt post feature produced an assemblage characteristics of the material indicate the presence of substantial fragments of larger species, in particular lesser-quality meat elements such articulating equid remains (radius and carpals) and a (probably) complete Bos metacarpal indicative of the deposition of fresh unprocessed remains. The faunal remains support the field observation that the unit comprises items to be disposed of later in combination with special deposit.

Building 96

A room infill Unit (19212) contained an articulating Bos astragalus and calcaneum (X2 and X3) and a scapula (X4).

Unit (19227) contained a bone cluster comprised of numerous large bovid remains some of which are articulated (distal radius and carpals) and equid and ovicaprine remains. The articulated material is indicative of incomplete food processing, This is a possible closure deposit.

Unit (19702), Feature 7000, was a pit fill with a high density of large fragments of bone, for example a nearly complete cattle scapula and pelvis (probably male), sheep femur and tibia. There is also a fragmented horncore with adhering plaster remains suggestive of an installation.

Unit (18645) – this bin fill was identified as a cluster however on examination comprised of a range of species, including human remains with no discrete identity.

Building 97

Unit (19239), a layer of burnt collapse, contained a Bos vertebra X find (X1). Two partial scapula were recovered from units (19665) X1, a bin edge and (19245) X2. a possible post retrieval pit fill.

Unit (186470) was a truncated floor with an unusual in the high proportion of large pieces of Bos (Aurochs) remains. Material recovered included both cranial and axial elements with many longbone represented in pairs (i.e. lefts and rights) possibly from the same individual (e.g. the pelves). There are fragments of both bovid and sheep horncores noted. Fox, dog and equid remains are also present. This assemblage represents a large quantity of meat, and therefore may be the result of a large-scale consumption event.

Additional Artefact Clusters

Discussed by phase and location

South.L

Unit (20452), Space 492 (possibly the annex of the Mellaart Shrine 8) contained a cluster of faunal remains lying close to/on the floor. This comprised a number of bones including an infantile sheep/goat scapula, a cattle metacarpal with articulating carpal 2+3, a cattle tibia (distal

end and shaft; probably left) and a deer skull (occipital and antlers). The deer skull had traces of possible cordage on the antler base on both sides (a sample of this material has been taken for further analysis).

South.M
Unit (19386), Space 470, 474, material associated with a group of clay balls recorded as an adult ovicaprine skull, mandible and long bones.

Unit (19387), Building 104 contained a cluster of complete sheep/goat metapodia: five metatarsals, four with articulating navicular cuboid, four complete metacarpals and one partial (this is a recent break so the remainder may not have been recovered). All of the complete metapodia show slight swelling on the lateral and medial aspects of the shaft (and occasionally on the posterior) two thirds on the distal third of the shaft. Two metapodia demonstrate a degree of periostosis in that area but most show no obvious surface remodelling. These swellings could be indicative of healed juvenile greenstick fracture (Knusel *pers comm*) and may provide evidence of hobbling or other restraint of animals.

Unit (19392), Space 470, field observations only have reported a large bovid horncore and ?worked red deer antler brow tine (sampled for RC dating).

South.P.
Bear remains in the form of a phalange recovered from an external dump deposit associated with Building 370.

North Area

Space 489 and 490
Units (20472) and (20449), in Spaces 489 and 490 respectively, are arbitrary midden units that were assessed as priority units. Because excavations in that space are on-going, detailed analysis is unwarranted until larger samples from these middens are available.

Space 87
Three units were excavated in Space 87: Units (19475), (20403), and (20404). As unit (20403) was redefined as part of (20404) post-excavation, these two units will be condensed and mentioned as only (20404) hereafter. Also as these were arbitrary units, the excavators consider them undifferentiated room fill, all three units – (19475), (20403), and (20404) – are combined in this description.

During excavation a series of unusual finds were recovered and the units were then subject to priority analysis. Seven Bos sp. horn cores were recorded as well as two fragmentary (non-speciable) caprine horn cores and 7 sets of cattle-sized articulated bones (three series of articulated vertebrae, two tibia/os malleolare pairs, and two radius/ulna pairs). These finds, identified in situ, pose interesting questions about the activities responsible for this assemblage.

The animal size-class proportions and species proportions in this deposit are seen in Table 9.8. A comparison of the three calculation strategies used by the faunal analysis team (size class, recording zone, and diagnostic zone) shows that taxonomic representation via DZ correlates

more closely with that apparent in the size class calculations than do the Zones proportions; while possibly a product of fragmentation patterns, this is most likely a product of sampling bias (i.e., a small DZ sample).

Abundance by Size Class		
Body Size	N	Percentage
Sheep-Size	519	28.56
Pig-Size	8	0.44
Cow-Size	1290	71.00
Total	1817	

Abundance by Recorded Zones		
Taxon	N	Percentage
Ovicaprid	34	40.96
Pig	4	4.82
Bos sp.	45	54.22
Total	83	

Abundance by DZ		
Taxon	N	Percentage
Ovicaprid	6.5	22.41
Pig	2	6.90
Bos sp.	20.5	70.69
Total	29	

Table 9.8. Abundance in Space 87 based on Animal Size Fragments, Recorded Zones, and DZ.

One advantage of the 'recording zones' system is the embedded measure of bone completeness. Because the minimum completeness required to be recorded using zones is 12.5%, comparisons of completeness involving sheep-sized, cattle-sized, and pig-sized elements overestimate completeness in general; however, comparisons between taxa should still be relevant. With that caveat, recordable sheep-sized bones in this deposit are roughly 24% complete, whereas Bos sp. average 37.5% complete; the two pig-sized elements are 100% (metatarsal V) and 50% (skull) complete. None of these remains were heavily processed, and the completeness of the cattle specimens is particularly noticeable compared to fauna at Çatalhöyük in general and the sheep-sized specimens in Space 87.

Lower-limb elements are less common in the Bos sp. specimens (see Figure 9.3), which may mean that the completeness of sheep-sized elements may be inflated by the higher density of these distal limb elements rather than a lower intensity of processing, which the completeness data suggest for cattle specimens (see above). The limb bone representation is also more even in caprines (1.27 upper:lower limb elements) than in cattle (2.15 upper:lower), suggesting selection for relatively meat-rich upper-limb elements from cattle. Coupled with articulated elements and the evidence of spiral fractures on two cattle-sized humeri (one left and one right), it is suggestive that the remains in Space 87 are associated with communal consumption (see Demirergi, et al., in prep. for a further discussion of the scale of consumption events at Çatalhöyük and its implications).

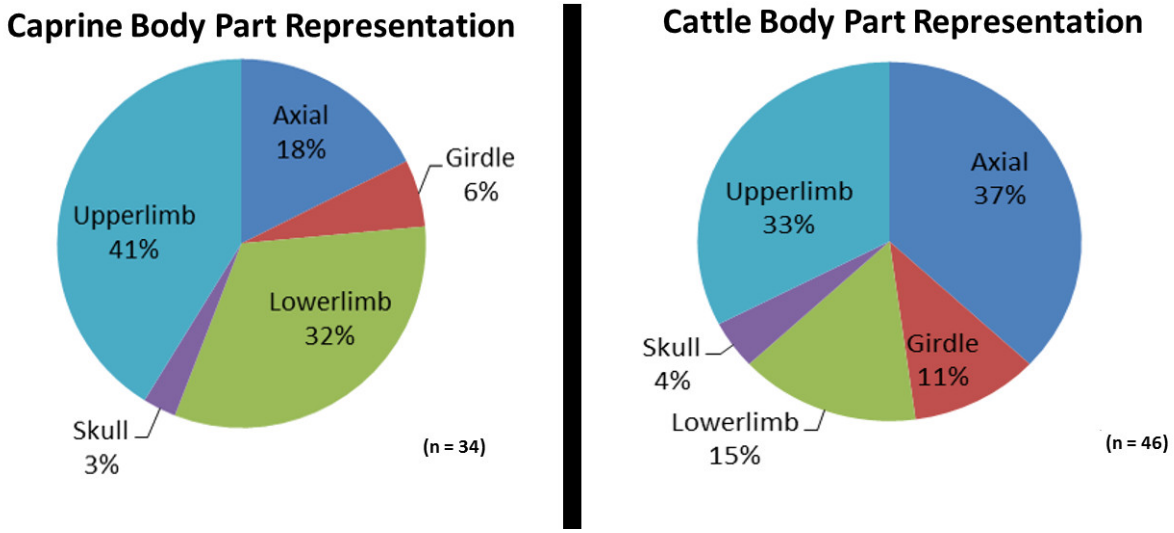

Figure 9.3. Comparison of body part representations of Caprine and Cattle elements in Space 87 (via Recorded Zones)

The general dearth of artifacts other than faunal remains reported by the excavators also highlights that the assemblage in Space 87 is associated with one (or several) consumption events, rather than typical depositional processes characteristic of middens or re-deposited soil.

Based on the presence of multiple sets of articulated elements, the question of how many cattle are represented in Space 87 is important for the interpretation of the room fill and its depositional history. The cattle MNI is 3, based on ulnar recorded zones; this total may change pursuant to further excavation and contextual analysis. The MNI of 3 is also lower than that suggested by the number of horn cores, raising the possibility that the horn cores may have been associated with different activities than the postcranial remains, and were perhaps curated before deposition.

Space 87 therefore has several aspects that make the unit interesting from a faunal perspective. There are large pieces of cattle that were deposited here in articulation, highlighting the fact that most of the remains were not highly processed. The presence of many horn cores is also noteworthy, especially because there are more horn cores than there would be animals based on post-cranial elements in Space 87. This is clearly not a typical faunal assemblage for room fill at Çatalhöyük. It seems possible that most of the assemblage is related to communal consumption, but the spatial distribution of the faunal remains (many of which were recorded as X-Finds) may help clarify the depositional history of the Space. The presence of horn cores, which have been noted for their social role in memorializing feasting events (Twiss, 2012), is surprising and may highlight aspects of the use-life for horn cores (and theoretically horns) that has not been discussed previously. Overall, however, further research of Space 87 should focus on understanding the deposition process to get a clearer picture of what activities occurred and whether any nearby houses were occupied and potentially responsible for this Space's contents.

Spaces 489 and 490

A midden is associated with Spaces 489 and 490. Two sequential samples, representing arbitrary spits of the lower (20472) and the upper (20449) layers of the midden were analysed. The lower midden layer was brownish-dark orange and full of charcoal, and contained a couple of hackberry deposits and a blackish ashy layer. The upper midden spit (20449), which lay below building 108, was greyer than (20472) and not layered.

A total of 306 animal bones were recorded from these midden deposits. The species composition in the two layers is similar, with a dominance of caprines and bovids over fox, dog, equids, suids, and badger—proportions typical of Çatalhöyük middens. If one considers both speciated elements and those identifiable to size class, the proportion of bovids is smaller in the upper midden layer than in the lower (Table 9).

The middens also contained bird bones, mollusc shells, and bone tools (points, needle, and rings; these were more numerous in (20472)). (20472) also contained fish bone; (20449) contained a concentration of egg shells. Pathologies (which affect ≤1% of faunal specimens at Çatalhöyük) are represented here by exostosis on the equid phalanx, sarcoma infection or trauma on the condylar processes of both left and right caprine mandibles, and by periostitis on a sheep humerus and a sheep-size long bone. One of the worked bones was made from a bone fragment with active periostitis.

The lower midden layer (20472) largely represents a quickly accumulated and undisturbed deposit, as indicated by the presence of articulated bones and elements from foetal animals, as well as by generally good surface conditions. Part of the assemblage, however, is covered with concretion, and is interpreted as fill.

The upper part of the midden (20449) is more osteologically heterogeneous. Surface condition ranges from good to poor, and the colour of bones from light brown to dark brown, with a higher percentage of darkly stained bones than usual. Some bones look very fresh; others look quite worked over. Some of the pieces are covered with concretion and some have root marks. Overall, the material looks like a mixed midden and fill deposit deriving from a variety of sources. This supports excavators' suggestion that this part of the midden was disturbed.

The midden assemblages contain a high percentage of digested bone (ca. 40%). They are biased toward feet, especially from sheep-sized animals (all such elements are digested), although cranial and other postcranial elements are also present. Digested bones far outnumber gnawed ones. Coprolites provide additional evidence for carnivore activity. Apart from teeth and some phalanges and carpal/tarsals, the elements in these deposits are fragmented; the bones from (20449) are more processed than those from (20472).

	(20472)	(20449)
Burning	1-10%	1-10%
Gnawing	1-10%	1-10%
Surface condition	good	variable
Cattle-sized specimens	20-50%	1-10%
Sheep-sized specimens	>50%	>50%
Other specimens	1-10%	1-10%

Table 9.9. Comparison of the midden sequences from North area, Spaces 489 and 490.

TPC

In space 494 an infill deposit and cluster of animal bones (20255, 20276, 20277, 20278, 20279, 20280, 20281) found between the walls of Buildings 110 and 111 and the oven contained 356 faunal specimens (86% caprine; table 10) as well as worked stones, ground stones, large ceramic sherds, shells, and phytoliths. The infill was arbitrarily divided into western, central, and eastern parts. Notable among these remains was a collection of 199 caprine astragali. They include 84 lefts and 96 rights, a minimum of 96 individuals whose ages range from foetal to adult. There is evidence of periostitis (active at the time of the animal's death) visible in one specimen's sulcus tali.

About 30% of the astragali are modified into what is commonly termed 'knucklebones' and they have been flattened on one or both sides. A similar deposit of 128 astragali was recovered from the fill of Building 67 (4040.H) (Russell et al, in press-b). Other worked bones in the deposit included the first phalanx of a small-medium equid with four modified surfaces and a bone point made on a caprine metapodial.

The infill also contained several articulated bones. Among these were caprine-sized lumbar vertebrae and ribs; cervical and thoracic vertebrae that probably derive from a hare; and sheep metatarsals articulated with tarsals and phalanges. One of the metatarsals appears pathological:

swelling noted on the lateral part of the distal shaft. This pathology is similar to that noted in Unit 19387, South.M. (see above) and may be an osteological reaction to some sort of restraint.

Other bones in the deposit included horn cores of sheep and goats (caprine foetal bones were found around the horn core); sheep and cattle scapulae; a large cervid antler; a roe deer tibia; a pig astragalus; a loose fox lower tooth; caprine-sized ribs; and the wing of large bird. A goat horn core, a sheep scapula, and a small ruminant rib were deposited on top of phytoliths, having lain perhaps on matting (analysis is in progress). The characteristics of the material suggest that portions of the assemblage were intentionally selected for purposeful deposition as special/foundation deposits.

Taxon	NISP	DZ
Bird	0.84%	0.00%
Bos sp.	1.12%	0.00%
Capra	12.92%	19.65%
Capreolus capreolus	0.56%	0.50%
Cow-size	0.28%	0.00%
Homo	0.28%	0.00%
Large bird	0.28%	0.00%
Large cervid	0.28%	0.00%
Lepus	0.56%	0.00%
Ovis	42.42%	63.73%
Ovis/Capra	30.90%	14.61%
Sheep-size	8.43%	0.00%
Small-medium equid	0.56%	1.01%
Sus scrofa	0.28%	0.50%
Vulpes vulpes	0.28%	0.00%

Table 9.10. Relative proportion of taxa in TPC infill (Space 494).

West Mound Trench 5

Only two weeks were available for study of the West Mound faunal material in 2012. During this limited time, analysis was focused on material from Building 98, particularly (a) a series of fills within space 340, and (b) deposits found directly on the floor of the building in all spaces.

A note regarding recording protocol changes

The changes made to the recording protocol by the East Mound faunal team this season (see above) presented a considerable dilemma for the West Mound research. Until now every effort has been made to ensure direct compatibility between faunal data the two mounds, and data from all areas continues to be entered into a single database. From 2012, however, it has regrettably been necessary to allow some divergence between the recording systems used on the two mounds.

It is important to distinguish between streamlining of the protocol - i.e. reduction in the number of variables recorded or removal of redundancy - and more fundamental changes which may introduce biases between datasets. The last major changes in recording protocol, during the 2007 season (Russell et al., 2007), were restricted to streamlining measures - primarily a reduction in the amount of taphonomic data collected - and did not prevent direct comparison with earlier data in all other respects.

Alongside further streamlining and some welcome rationalisation, however, the 2012 recording overhaul includes several changes that will inevitably introduce systematic (if admittedly minor) bias between the old and new datasets. This occurs most notably through changes to the rules determining which specimens are considered diagnostic: several elements that were previously identified to taxon and recorded in full are now excluded from detailed analysis, while certain other elements only ever recorded to body size category in the old system are now potentially identified to species. Such changes may or may not represent an improvement to the system, but they reduce comparability when it comes to taxonomic and anatomical composition.

Since these changes come at the start of a new excavation/publication cycle for the East Mound, the loss of strict back-compatibility is a minor concern: data from the previous cycle will soon be in the public domain and future analysis will largely be restricted to new data. For the West Mound, however, the changes come in the middle of a research cycle and are hence highly problematic. Forced to choose between forward-compatibility with future East Mound research on the one hand, and the integrity of my own dataset *plus* back-compatibility with the entire archive from both mounds on the other, there was only one viable option. West Mound faunal analysis will thus continue to use the same core recording system as in previous seasons. However, almost all of the *streamlining* changes instituted by the East Mound team have been adopted also for the West Mound fauna, and analysis is proceeding at a faster rate accordingly. Full details of the protocol will be included in the final report.

Building 98

The 2012 season saw the discovery of the first unequivocal floor in Trench 5. Fittingly, this occurred in our first defined building, B.98, where fills in all five spaces (i.e. the four corners and the central area) came down onto a single plaster surface (16977). The basal fill units overlying this floor (16976, 16980, 16982, 16992) were all studied this season and vary quite widely in terms of taphonomy and composition, generally exhibiting similar composition and taphonomy to their overlying fills. Since finding a floor often raises hopes of associated abandonment deposits or *in situ* house contents, the following description of these units is geared towards establishing the nature of the basal deposits.

In space 340, the basal unit (16992) contains a relatively low density of bone and is in worse condition than most deposits elsewhere in Building 98. Fragmentation is quite severe, surface condition is generally poor, organic staining is common, and there are no articulations. In other words, this appears to be a dump of redeposited rather than fresh material. A sequence of seven immediately overlying fill layers from space 340 (15366, 15374, 15389, 16950, 16951, 16969, 16970) were also studied this season. While (16950) and (16951) are associated with a discrete ashy lens, the underlying layers (16969) and (16970) are arbitrarily defined layers of fill. Since the latter appear very similar to the basal unit (16992) in terms of composition and taphonomy, and have the same approximate density of finds, it seems likely that all three represent a single deposit that took place at some point after the abandonment of B.98. There is no evidence for any primary material or abandonment deposits on the floor in this corner of the building.

In the south-west corner of the building - Sp.341 - the basal fill (16980) contains a mixture of fresh and apparently reworked material, with multiple *in situ* articulations indicating that a substantial portion of the assemblage was in primary context. These include several partial

sheep feet, the most impressive of which featured the complete metacarpal and first four phalanges. There are also several bone X-finds: a complete cattle scapula, worked red deer metatarsal blank, and three pieces of worked antler (one tine and two column cylinder preforms). All of these appear from their coordinates to have been at the base of the unit, i.e. on the floor, although it should be noted that similar specimens were found slightly higher up in the fill in some spaces within the building. It is not clear whether the articulated sheep feet were also *in situ* on the floor or were part of an initial post-abandonment dump of fresh remains.

In spaces 449, 452, and the eastern part of 450, unit (16976) appears to consist primarily of fresh material, with only a little redeposited 'background noise'. The material is moderately fragmented, but in good condition, with a number of conspicuously large and intact fragments and a few articulated sets of sheep/goat bones. Stand-out specimens include a piece of worked antler and two very fresh-looking rib pieces from a pig-cattle sized animal, each measuring approximately 25cm. Given the prevalence of bone-working materials and blanks in the lower/basal fills of B.98, and the presence of expedient tools made on rib fragments (see Franz, 2012 figs 90, 92) these specimens should perhaps be seen in the same light as the various red deer antler and metacarpal fragments.

Finally, the western part of Sp.450 (i.e. the central area of B.98) is represented by two units. The main fill unit (16982) is similar to (16980): a moderately rich, fairly fresh deposit that doesn't really stand out from overlying fills. The entire south-west corner (bordering Sp.341), however, was taken up by a very large, dense, cluster of pottery and bone directly on the floor, which was treated as a separate layer: unit (16981). Apart from numerous bone tools, and some lightly-fragmented sheep/goat remains, the cluster included a pair of cattle mandibles articulated *in situ* and recovered as X18 and X19 (see Figure 5.2). It is not entirely clear whether the unit consists of artefacts placed on the floor at the point of abandonment or dumped in from above subsequently, but it is safe to say that this is one of the absolute earliest events represented within the fill of B.98 and hence a strong candidate for dating.

The upshot of this discussion is that the majority of the material in the basal fills of B.98 probably represents post-abandonment dumping, although certain specimens - particularly bone/antler working blanks - may have been present on some parts of the floor when dumping began.

Building 105

Unit (16966) represents the entire base of B.105, i.e. Sp.342, and was assessed this year. It appears to represent a large primary dump of remarkably homogenous material, with very light fragmentation, good surface condition, and numerous articulations. It is a priority for full recording in 2013.

Taxonomic representation

The taxonomic composition of material studied during 2012 is shown in Table 9.11 in terms of diagnostic zones (DZ, Watson, 1979). The overall picture changes little as a result of the new data, although the higher frequency of cattle is interesting. The frequency of red deer is a little misleading, since most of the DZ derive from several partially worked metatarsals that appear to represent curation of material for tool production. Numerous pieces of red deer antler (and one

	Upto 2011		2012	
	DZ	%	DZ	%
Caprines	1009.5	92.9	236.0	90.8
Sheep	*529.5*	48.7	*119.5*	46.0
Goat	*116.0*	10.7	*21.0*	8.1
Sheep/Goat	*364.0*	33.5	*95.5*	36.8
Cattle	29.5	2.7	14.5	5.6
Pig (wild?)	0.5	0.0	0.5	0.2
Equid	32.0	2.9	4.0	1.5
Red deer	0.5	0.0	4.0	1.5
Dog/Wolf	9.4	0.9	0.8	0.3
Fox	3.6	0.3	0.0	0.0
Small carnivore	1.2	0.1	0.0	0.0
Total	**1086.2**	**100**	**259.8**	**100**

Table 9.11. Taxonomic composition of Trench 5 faunal material studied in 2012, compared to previous years.

of fallow) have also been recovered from building 98, but may of course represent collection of shed antlers rather than hunting.

Metrical data

A large quantity of metrical data continues to be collected. For sheep, routine measurement of both mature and unfused specimens is helping to reveal herd structure (see Russell et al., in press-a), but this is a complex process beyond the scope of this report. Measurable cattle specimens are something of a rarity on the West Mound, but the sample of specimens that can be compared using the log ratio (LSI) method was increased from 13 to 21 during the 2011 and 2012 seasons. Given the widespread interest in the domestication status of cattle at Çatalhöyük, it is worth producing an updated distribution here (Figure 9.4). The mean and median LSI values are -0.0543 and -0.0631, considerably smaller even than for the upper part of the South Area sequence (South.P-T; -0.0239 and -0.0221 respectively), where the cattle are believed already to have been predominantly domestic (Russell et al., in press-b).

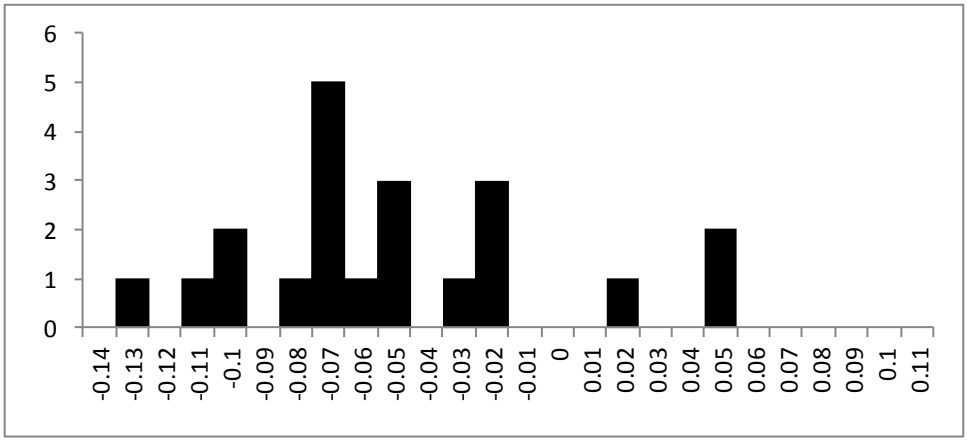

Figure 9.4. Distribution of LSI values for West Mound cattle, by reference to the 'Ullerslev Cow' (Degerbøl and Fredskild, 1970).

Radiocarbon Samples

A total of 90 radiocarbon samples from 39 units were provided for A. Bayliss; these included two *Bos* sp specimens from the Mellaart excavations.

aDNA Samples

Previous aDNA sampling and analysis has been undertaken at Çatalhöyük e.g. Edwards et al., 2004 and Anderung and Anderung 2007 and this new project builds upon previous work. A total of 22 Bovid species, 7 Ovid, 5 Caprid and 7 Suid were sample for ancient DNA by A. Scheu of Mainz University (Table 9.12). Both wild (16) and possible domestic (6) bovids were sample from a range of Hodder Phases (G, L, K and M) and areas. The Ovids and Caprids were all domestic (from Hodder phases H, I and R, and West Mound Chalcolithic) and the Suids all wild (from Hodder Phases G, H, I and L).

Lab Code	GID	Area	Hodder Phase	Taxon	?Wild/ ?Domestic
Ch12	2210.F15	Bach	G	Bos	Wild
Ch13	3021.F40	North	G	Bos	Wild
Ch14	4879.F8	South	G	Bos	Wild
Ch15	13107.F49	4040	I	Bos	Domestic
Ch16	8864.F928	4040	I	Bos	Domestic
Ch17	14136.F182	4040	I	Bos	Wild
Ch18	4850.F109	South	I	Bos	Wild
Ch19	4850.F114	South	I	Bos	Wild
Ch20	4465.F71	South	K	Bos	Wild
Ch21	1868.F336	South	K	Bos	Domestic
Ch22	1066.F33	South	L	Bos	Wild
Ch23	1505.F225	South	L	Bos	Wild
Ch24	1520.F114	South	L	Bos	Wild
Ch25	1576.F199	South	L	Bos	Wild
Ch26	3314.F152	South	L	Bos	Wild
Ch27	3314.F206	South	L	Bos	Wild
Ch28	1092.F531	South	M	Bos	Domestic
Ch29	1506.F368	South	M	Bos	Wild
Ch30	1091.F62	South	M	Bos	Wild
Ch31	2910.F171	Trench 1		Bos	Wild
Ch32	2959.F264	Trench 1		Bos	Domestic
Ch33	18316.F18	Trench 5		Bos	Domestic
Ch34	4824.F15	South	H	Ovis aries	Domestic
Ch35	14071.F27	South	R	Ovis aries	Domestic
Ch36	17058.F410	South		Ovis aries	Domestic
Ch37	15180.F33	Trench 5		Ovis aries	Domestic
Ch38	15180.F34	Trench 5		Ovis aries	Domestic
Ch39	2911.F40	Trench I		Ovis aries	Domestic
Ch40	3457.X20	Trench I		Ovis aries	Domestic
Ch41	10264.X30	4040	H	Capra hircus	Domestic
Ch42	10264.X49	4040	H	Capra hircus	Domestic
Ch43	14136.F72	4040	I	Capra hircus	Domestic
Ch44	6558.F53	Trench I	Chalcolithic	Capra hircus	Domestic
Ch 45	10293.F2	4040	G	Sus scrofa	Wild
Ch 46	10714.F13	4040	H	Sus scrofa	Wild
Ch 47	14179.F8	4040	I	Sus scrofa	Wild
Ch 48	14179.F9	4040	I	Sus scrofa	Wild
Ch 49	4121.F295	South	?L	Sus scrofa	Wild

Table 9.12. List of ancient DNA samples

Worked Bone

A worked bone specialist was not present for the 2012 season, hence this material was not recorded in detail and is only given a brief consideration here. Many potentially worked specimens were identified during excavation and were recorded as X finds (table 13). Generally these were not seen by members of the faunal team unless part of a unit which was scanned as a priority or fully recorded. Other specimens were identified during the faunal recording process.

Area	No.	No. crates	Frequency
South	26	5	5
North	62	12	5
TPC	85	5	17
West mound Trench 5	94	7	13

Table 9.13. Frequency of worked bone, antler or ivory in the 2012 assemblage by area

The high frequency estimation for TPC is due to inclusion of the modified specimens from the substantial deposit of caprine astragali in the cluster from space 494 (described above). If this atypical group is excluded, the frequency of worked bone from TPC drops to 5%, the same as that in the North and South assemblages. Similar deposits not having been noted from the West Mound, the higher frequency in the West mound assemblage is notable, this could have several causes: 1) a real change in frequency; 2) preservational variance between the West and East Mounds resulting in greater visibility of modifications to bones in the West Mound deposits; 3) greater tendency on the part of the West Mound excavation team to err on the side of caution when identifying and field recording possibly worked specimens.

Artefact types represented include, as in earlier seasons, points, needles, rings, scapulae 'plaster' tools, antler billets and burnishers/polishers worked on cattle size ribs as well as several examples of equid and Bos teeth which had been utilised in the same fashion.

Konya Basin Palaeoenvironment Project

The Konya Basin Palaeoenvironment project (KOPAL) in 1993 generated the remains of several disarticulated adult human individuals co-mingled with the fragmented animal remains. In total 13 crates of faunal material were recovered and in 2000 six of these crates, some 122 units were studied to some degree (not all units were fully recorded) and produced around 300 identifiable specimens (Martin, Russell and Frame 2000). Initial assessment of the human remains contrasts with the generally complete primary burials encountered within structures on the mound there is a lack of complete human individuals with many, but not all, parts of the body present and evidence for 'dry fractures' indicative of a secondary deposit. The partial faunal analysis revealed an intriguing assemblage made up of large pieces of larger animals with an unusual predominance of wild species (cattle, deer & wild boar) and wide range of body parts (Martin, Russell and Frame 2000)

A further 169 units remain unexamined and this season 22 units, contained within three crates, were assessed. The presence/absence of species was noted - bovids were present in 19 units, caprines in 16, equids and canids in 7, cervids and suids in 5 and humans in 2. Material showed a range of fracture patterns and was generally well preserved.

Whilst comingled human and animal remains are not uncommon occurrences on archaeological sites the KOPAL material offers excellent potential for future research. Mixed deposits are often interpreted as disturbance, cannibalism, or unusual funerary rites but this interpretation can be flawed with separate analyses by independent researchers leading to interpretations that reflect impressions upon discovery. To distinguish among these possibilities detailed assessment and comparison of the mixed assemblages must be completed to define the processes that led to

these superficially similar contexts. The excellent preservation of osteological remains at KOPAL provide an opportunity to interpret the entire osteological dataset via body part representation, fragmentation analysis, bone breakage patterns and assessment of taphonomic effects.

It is proposed to gain an in-depth understanding of the formation of the deposit through an enhanced standard osteoarchaeological analyses. This will draw on recent research on taphonomy, midden formation and integrative methods of recording human and animal bone. The proposed methodology will use the Knusel and Outram 2004 zonation method with detailed taphonomic recording (weathering, animal gnawing, burning, & root activity). Additionally a sub-sample of material exported for supplementary taphonomic, histological and collagen analysis after Madgwick and Mulville (2011, 2012), and Koon et al. (2010). The results will be compared with a sub-set of mound material from pre- and post-KOPAL contexts.

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10. Macro- and Micro-Botanical Remains

Amy Bogaard, Mike Charles, Dorian Fuller, Philippa Ryan, Elizabeth Stroud and Petra Vaiglova

The archaeobotanical team in the field, 2012

Flotation foreman: Mevlüt Sivas
Flotation officers: Hyunyoung Kim, Charlene Murphy
Archaeobotanical assistants: Mary Berman, Annette Hansen, Rachel Hodara, Rosemary Hoshimo, Jinok Lee, Jacob Morris, Anna Shoemaker, Jade Whitlam
Phytolith analysis: Philippa Ryan
Team leaders: Amy Bogaard, Mike Charles and Dorian Fuller

Preliminary macrobotanical results for 2012

(contribution by Amy Bogaard, Michael Charles and Dorian Fuller)

The flotation team processed 521 samples (c. 11,430 litres of soil) during the 2012 season. As in previous years, at least 30 litres (where available) were processed from each deposit; average sample size was c. 22 litres in 2012.

We carried out level 1 assessment on samples from the 2012 excavations in the North and South areas of the East mound, and completed a large backlog of samples from the 2011 excavations; there will be a (much smaller) backlog from 2012 to be cleared in 2013. Level 1 assessment consists of identification and counting of crop and wild plant remains in a random subsample of the >1 mm flot fraction, plus scanning of the >4 mm flot fraction (see 2005 Archive Report for methodology).

All samples from the 2012 excavations on the West Mound and from previous years have been exported for full study in the UK by Elizabeth Stroud as part of a DPhil at Oxford (see below). Preliminary work on these samples, including assessment of all 2012 material, is summarised by Stroud below.

A total of 21 samples derived from excavation units designated as priorities for specialist feedback in the course of the 2012 season: three from the South area (20325, a dirty floor in B.97; 19394, a 'greasy' surface in Sp.470; 19802, fill between walls of B.76 and B.80); nine from TPC (including intact midden units such as 20215) and nine from the North area (midden units 20449, 20472 (2 samples); burial fills 20428 and 20492; burnt surface 20447; burned fill 20403; bin floor 19575; and a concentration of mustard seed (20459) in bin F.3650). These priority samples received level 2 assessment (identification and counting of crop and wild plant remains in a larger random subsample of 1 mm flot fraction, plus a subsample of the >4 mm fraction – see 2005 Archive Report for methodology). We provide preliminary assessments of particular units of interest.

South area, unit 20325, dirty floor of Sp.365, B.97: Dirty floor units provide evidence of indoor plant-related activity. This low-density deposit (*c.* 5 items per litre soil) contained wood fuel remains and residues from dehusking of glume wheats and shelling of nuts (almond, pistachio), activities that are also widely documented in other buildings throughout the sequence (Bogaard et al. in press). Phytolith remains (see below) tell a similar story.

South area, unit 19394, 'greasy' surface, Sp.470: This unit yielded wood charcoal plus a low-density (*c.* 1 item per litre soil) mixture of charred cereal grain, indeterminate pulse, glume bases and hackberry nutlets. The implication of diversified plant use including cereals, pulses and fruit/nut taxa is widely indicated by use deposits across other buildings (Bogaard et al. in press). An associated deposit (unit 19393) of wheat husk phytoliths suggests the presence of spikelets and/or dehusking residues (see below).

TPC area, unit 20215, midden in Sp.486: This midden unit contained a moderately high-density (*c.* 75-150 items per litre) mixture of cereal material (predominantly glume bases but also barley, free-threshing wheat), pulse seed (pea), wild/weed seed and sedges seed, as well as a few fragments of tuber and charred food residue. Like the other middens assessed here, this unit reflects a typical mixture for re-deposited residues from domestic plant-related activity (see Bogaard et al. in press).

North area, unit 20449, midden in Sp.490: This deposit was moderately high in density (*c.* 91 items per litre) and dominated by the by-product (glume bases) of glume wheat dehusking, alongside cereal grains, pulse seeds, wild/weed seeds, sedge seeds, reed stem and fruit/nut material. The material was not burned *in situ* and suggests a mixture of activity residues generated elsewhere.

North area, unit 20472, midden in Sp.489: This midden deposit, of moderate density (*c.* 37 items per litre soil), contained a similar mixture of glume wheat processing and other crop material (including barley rachis), alongside sedge and reed material.

North area, unit 20459, burnt botanical cluster in Sp.98, bin F.3650: This charred mass of small-seeded wild mustard (e.g., *Descruraínia*) retained the shape of bag-like container and was found in a clay bin. The practice of placing stored plant material in bags/pouches within bins is also attested elsewhere in the North area (e.g., Building 52 – Bogaard et al. in press).

Preliminary phytolith results for 2012

(contribution by Philippa Ryan)

This report describes on-site phytolith (microbotanical remains) analyses undertaken between 15 July and 1 August. Many of the samples were studied as part of 'priority tours', where feedback was discussed on-site with excavators and other specialists. These and other samples examined, as well samples exported for future analyses are discussed here. Phytolith samples from wide ranging archaeological contexts (such as storage bins, hearths and middens) are being studied to investigate the types of plants used for food and non-food purposes (such as basketry or fuel), spatial arrangements of plant based activities, and temporal change. Notable samples this season included instances of macroscopically visible phytolith lenses of cereal husks, which may be examples of *in situ* deposits of de-husking waste.

Phytoliths are formed when soluble silica is taken up in groundwater and deposited within or in-between certain plant-cells. Rates of phytolith production, as well as the degree of taxonomic information they can provide, varies between plant taxa and not all plant families produce

phytoliths. The largest quantities of phytoliths are produced by grasses and sedges. Areas of epidermal tissue can become silicified creating multicellular 'silica-skeletons' (Rosen 1992).

Sediment samples were semi-processed using field-processing methods described in the 2006 and 2007 archive reports. This processing is preliminary, and further processing (where phytoliths are fully extracted) is required to enable quantified analysis. Macroscopically visible phytoliths (such as from traces of basketry remnants) however can be directly mounted onto microscope slides. Phytolith slides were analysed using a light transmitting microscope at x400.

Samples analysed for priority tours

Space 470 South Area
19394.s3 - Greasy lenses/occupation build up
This sample had very low phytolith content, interpreted as 'background noise'.
This micro layer was immediately beneath (19394), or the basal boundary of (19394).
19393.s2,s5 - Phytolith layer
This sample was taken from a laterally extensive whitish layer of macroscopically visible phytolith remains. Identification of phytoliths present indicated that this was from a compressed lens of husks, predominantly from wheat (*Triticum* sp.) but some wild grass husks were also present. This deposit most likely represents de-husking waste (glume wheats require husks to be removed from the grain), but it is also possible that this lens derives from whole spikelets (phytoliths only form in the husk chaff and not the wheat grains themselves).
20524.s3,s4 Visible phytoliths evident in the boundary between the fill and floor surface
This sample is not the same as (19393). Phytoliths were visibly present as silica skeleton traces of whole leaf/stem parts. These were randomly orientated so were not matting, and rather have the visual appearance of dumped leaves/stems. Phytoliths present were mainly from grass leaves/stems.

20449.s3 Space 490 North Area - Midden
This midden sample was notable for high proportions of phytoliths from wheat husks, and otherwise was generally 'midden like' with monocot leaf/stem as well as some dicot phytoliths. There were lower proportions of phytoliths from *Phragmites* reeds than other 4040 midden spaces analysed (from later North phases), and this may fit within the broader trend previously identified of reeds increasing over time (Ryan *in press*).

20472.s5 Space 489 North Area – Midden
This was a phytolith rich midden, with phytoliths from wheat husks, *Celtis*, and monocot leaves/stems most likely representing domestic waste with a mix of food processing debris and fuel remnants. Very fine micro-stratigraphic lens were apparent in section, including thin (1-5mm) ashy layers. Several of these micro-lenses have also been sampled, as well as from adjacent units for full analysis back in the UK.

20325.s3 Space 365 Building 97 - Dirty Floor
This sample contained phytoliths from wheat and wild grass husks, monocot leaves/stems including from *Phragmites* reeds, and woody taxa. Overall this sample was moderately phytolith

rich, and quite mixed. The phytolith assemblage is most likely deriving from cereal de-husking waste and the ashy remains of fuel.

20342.s3 Space 365 Building 97 - Dirty Floor
This unit was similar to the other dirty floor unit (20325) but overall had a greater proportion of phytoliths from leaves/stems, and woody phytoliths and fewer grass or cereal husk phytoliths. The phytolith assemblage most likely derives from cereal de-husking waste and the ashy remains of fuel.

20232s.4 TPC Area – Possible midden
At the base of this unit, immediately above a bricky layer, several phytolith samples were analysed from macroscopically visible silica skeletons (multi-cell phytoliths, where whole plant parts are silicified). Some of these phytoliths were from reeds and others from wheat, barley and wild grass husks.

NON PRIORITY SAMPLES

20492s.8 Space 77 North Area – Possible cordage
Phytolith material from possible cordage adjacent to a skull.
This material was not identifiable.

20413s.1 F3642 Space 336 B 77 North Area – Baby burial basket
This burial is currently being micro-excavated in the laboratory, with the help of Scott Haddow, to be continued next year. Some plant material is apparent, most likely from a basket. The preservation is partially through charring. Phytoliths present so far have been identified as from grass leaves as well as sedges, possibly representing more than one material type used in the basket – *pending further investigation*.

16980.s5 Space 341 Trench 5 West Mound – Phytolith layer
A thick (c 1cm depth) layer of macroscopically visible compressed wheat husk phytoliths was found on a pot sherd (circa 7cm by 5cm). The broader unit contained fill deposits, possibly rubbish. This was a very pure deposit and most likely represents a discrete dump of cereal de-husking waste which has then decomposed *in situ*, and survived as the pot sherd created a stable surface.

19724.s3 Space 379 Building 96 South Area – Matting from a child burial
Phytoliths were from wild grass leaves/stems. Some husk phytoliths were also present (grass husks are not used in weaving – these may potentially be from immature inflorescences or possibly deliberately placed)

Future phytolith analyses

A number of samples were taken from midden spaces 489 and 490 in the North Area, and some preliminary analyses are discussed above. Samples were taken as sub-samples from bulk sediments to look at general phytolith composition and for comparison with other datasets, as well as from smaller micro-lenses from within this units to examine smaller scales of change.

Fuller laboratory processing of these samples will generate results that can be compared to previous analyses of middens that have revealed temporal changes in plants present, notably increases in *Phragmites australis* (common reed) from around site phase South P/Q onwards (Ryan *in press*). Samples were taken from a selection of fire-spots excavated between 2009-2011 to extend previous phytolith analyses of these types of contexts, and for the future comparison of results on a sample by sample basis with the macrobotanical and charcoal teams. Also planned for future analysis in the UK are possible phytoliths from ground-stones. Ground-stones were sampled this season by Huw Barton, who is processing samples to extract starch and phytoliths and examining the starch. Combined macrobotanical and microfossil examination of dung pellets is also planned.

Current postgraduate research in archaeobotany at Çatalhöyük

West Mound archaeobotany

Elizabeth Stroud, University of Oxford

This autumn I have begun analysis of the West mound archaeobotanical assemblage from trenches 5 and 7. This work comprises part of a wider DPhil project examining agricultural processes and crop husbandry during the Chalcolithic. My research incorporates examination of archaeobotanical material from the West Mound in order to understand a number of factors including crop husbandry practice, growing conditions and plant use, as well as crop processing and the taphonomic pathways of the material. I will compare the Çatalhöyük assemblage to a later Chalcolithic site (Çamlibel Tarlası, near Boğazköy) to assess similarities and differences in these different settings.

As part of this research I have already scanned 72 samples, including 35 samples from the 2012 excavation, together with a number of samples from previous years. The samples were scanned at a level 1 assessment following the methods described by Bogaard *et al.* (2005).

Overall, the samples have the same characteristics as those described from previous years (see Bogaard and Charles 2010). Glume bases are ubiquitous, occur in high densities and generally outnumber glume wheat grains by over 20 to 1. However, the cereal grains most common in the samples are barley grains rather than glume wheat grains, which raises interesting questions of different crop status and discard practices. Sedge seeds form a significant component, with some samples containing over 250 seeds. This observation echoes similar findings in previous research on both the East and West mounds (Fairbairn *et al.* 2005; Bogaard and Charles 2010; Bogaard et al. in press).

Previous researchers (Fairbairn *et al.* 2005; Bogaard and Charles 2010; Bogaard et al. in press) have noted the dominance of glume wheat bases (a by-product of glume wheat processing) in the archaeobotanical assemblages of both mounds. My work on the 2012 samples supports the inference that dehusking of glume wheat occurred on a household basis, with stored spikelets dehusked as needed (Bogaard and Charles 2010). The abundance of sedge seeds also indicates that inhabitants still had access to wetland areas; the hypothesised reduction in localised flooding (Boyer et al. 2006) does not seem to have impacted on the availability of wetland plants

(cf. Bogaard and Charles 2010). My future research will also investigate the significance of the increase in hulled barley grains relative to the East mound assemblage (Bogaard et al. in press).

Stable isotope analysis of archaeobotanical material

Petra Vaiglova, University of Oxford

This analysis forms part of a doctoral project investigating the nature of agricultural management in early farming contexts. The Çatalhöyük component will complement work that has been done previously on faunal and human samples by Pearson (in press), which aimed to disentangle variability in isotopic ratios using spatial analysis across various contexts and areas.

The botanical material to be sampled for isotope analysis will include cultivated cereals and pulses from a range of primary contexts (burned buildings, oven rake-out deposits) and middens covering as much of the Neolithic sequence as possible, primarily in the South area. Stable carbon and nitrogen isotope values of cultivated crops and dung-derived forage taxa will inform interpretation of the isotopic signatures of the humans and animals that consumed these plants. In addition, crop stable isotope values will provide us with an opportunity to *directly* address any changes in cultivation strategy through time. Specifically, inference will be made about key aspects of the growing environment (water availability, and practices such as manuring) that relate to cultivation intensity. This will have implications for the scale of the agricultural system, its spatial conifiguration and how its social geography changed through time.

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11. Pottery Report, 2012

Team Leader: Serap Özdöl (1)
Team Members: Duygu Tarkan Özbudak, Hilal Gültekin (2)

(1) Ege University, (2) Istanbul University

In the 2012 excavation season a new team started working in the pottery laboratory as was the case in nearly all the other laboratories and research fields at Çatalhöyük. Even though the scholars forming the team got together for the first time this season, this new team consists of scholars who were already members of the Project[1]. The works carried out in this last phase of the 25 year Çatalhöyük Research Project enabled different excavation teams to work together and integrate in the field, more students were able to get experience in the field, the experienced and inexperienced groups were more interactive and multi-vocality was more prevailing than the previous years, thus bringing a new approach and process to the site. The new pottery team will integrate in this process and determine its own approach style and aims. The team will conduct collaborative works in keeping with their specialized subjects, thus widening their perspective on the material they are working on and contributing to the Çatalhöyük settlement by trying to answer the basic questions and secrets.

Serap Özdöl conducted her work at Çatalhöyük throughout the entire excavation season (June 18th – August 31st 2012) while Duygu Tarkan Özbudak joined during the field season (July 7th – August 10th) and Hilal Gültekin was present between July 23rd– August 7th.

Professor Rosemary Joyce from the University of California visited the pottery laboratory in 2012. During her short visit, Professor Joyce examined production techniques and visual traces on the samples that we had chosen from among the older material and classified according to the ware group. In the future Professor Joyce will continue contributing to the pottery studies at Çatalhöyük.

[1]**Serap Özdöl**, Team Leader, Assistant Professor at Ege University. She was a team member of the Çatalhöyük Research Project between the years 1996-2003 working as a field archaeologist, thin section analyst (2000) and pottery specialist (2001-2003). In 2000, Serap Özdöl chose 70 pottery sherds unearthed between the years 1995-1999 and took them to Adana, Çukurova University, Archaeometry Department in order to do thin section, chemical and micromorphological analyses. She worked on these sherds together with the archaeometry team during three months with both the visual method and the archeaometric analysis method (Özdöl 2006; Özdöl 2012; Last et al 2005; Akça et al 2009). She was the pottery specialist in the settlement in 2003 (Yalman and Özdöl 2003). Serap Özdöl's dissertation was from Çatalhöyük on all the unpublished pottery assemblages from Mellaart's period and on the unexamined and unpublished material of the contemporary and neighboring settlements, Erbaba and Süberde in the Beyşehir-Suğla Basin (Özdöl 2006). Between 2004-2009, she carried out specific museum studies on the unexamined Late Neolithic pottery of the Erbaba in the Konya Archaeological Museum. She returned to the Project in 2011 as an Assistant Director and a pottery specialist of the Çatalhöyük Research Project. She has publications on the Çatalhöyük, Süberde and Erbaba pottery and the Neolithic pottery of the Anatolian plateau and the Near East (Özdöl 2007, 2008, 2008a, 2009, 2012).

Duygu Tarkan Özbudak, Team Member, M.A. Student at Istanbul University. She has been a team member of the Çatalhöyük Research Project since 2004 as a pottery specialist on clay source (raw material). She has been doing her M.A. thesis on the clay source of Çatalhöyük pottery and the thin section analyses of the pottery under the supervision of Professor Chris Doherty.

Hilal Gültekin, Team Member, M.A. Student at İstanbul University. She has been a team member of the Çatalhöyük Research Project since 2004 as pottery specialist focusing on the pottery typology. She is doing her M.A. thesis on the distribution analyses of the architectural elements and small artefacts (except pottery) of Çatalhöyük.

The main topics of the researches carried out by the team members

Besides her studies on Neolithic pottery, Serap Özdöl also continued her position as Assistant Director and carried out her administrative responsibilities and duties throughout the excavation season. She also brought a new order to the clay objects laboratory where many specialists work and together with the pottery team, especially with Duygu Tarkan Özbudak, Serap put forward the old and new pottery research data in order to develop a new system and new pottery database.

Duygu Tarkan Özbudak largely contributed towards developing a new database and determining the new problems and aims. She shared her knowledge from her previous studies on Çatalhöyük pottery that included clay analyses of the raw materials for pottery as part of her M.A. thesis. During her stay at Çatalhöyük this season, Duygu carried out work on the problems about the pottery unearthed and publications made in the previous years by using computer programs. Duygu was also involved in examining newly excavated materials and entering their basic data into the excel programme. She also joined the priority tours and evaluated some priority units.

Hilal Gültekin stayed at Çatalhöyük for a short time in the 2012 field season. During this time she conducted research for her own thesis and contributed to the discussions regarding past and future issues regarding the pottery team, including the development of a new database. Most importantly, Hilal gave very useful information on the criteria used during the development of the shape typology catalogue prepared and printed under her supervision.

Problems on the evaluation of the material and the activities and some results of the 2012 ceramic studies

The 2012 ceramic team discussed research methods, databases, and the achieved conclusions reached by the previous pottery teams and other scholars who worked on the pottery of Çatalhöyük. We determined the missing aspects and other subjects of curiosity and also specified the new problems, questions, and purpose and aims of their research. After many discussions, the concept of the new database was developed. However this new database could not be created with the Access program in the field in 2012 and this job has been left for 2013. Instead, all the data related to the studied material was entered into Excel, in keeping with the afore mentioned new database. The data in Excel will be transferred to Access in 2013.

The fact that the data was being entered into Excel and the concern that when it is transferred to Access next year some data loss may occur, created an adverse effect on the input. Not having clear criteria for the database and only being at the trial phase of data input generated a concern that the pottery samples may be evaluated with different criteria and expertise. This concern occurred especially regarding the late, mixed materials from the TPC surface areas. Since all the team were unfamiliar with the pottery of the last phases of the Neolithic period uncovered in TPC, there was difficulty especially in defining and doing ware classification of the material from that time period. By reason of the possibility that there may be pottery samples of the earliest and middle phases of the Neolithic period within the TPC units and also due to the fact that typical Chalcolithic, Bronze, Iron and Classical period material was encountered there, most of the units were declared “unsafe” and created difficulties in sorting.

In 2012, the South and 4040 areas provided a very small amount of pottery material. Whereas in the newly excavated “TPC” area, which links the old TP area and the South, a large amount of

pottery finds were obtained. Besides excavating areas that had never been studied before, some areas that had been excavated in the 1960's by Mellaart were reopened.

Only one vessel found in the TPC area, in a cluster of burnt pottery sherds, could be conjoined. It was unearthed in a unit (20255) excavated between the walls of two buildings that had been related to Level III by Mellaart. This holemouth jar (S.1.) carries the pottery features defined by Mellaart as the pottery of Level III (Özdöl 2006). Unit (20255) was one of the most significant units of the TPC area for this year. Other than the completed jar, a complete sorting and data input was not done for the other sherds obtained from this unit. In addition, other than one pot sherd made on the potters' wheel, it can be said that all the others are Neolithic pieces. Therefore, this is the most homogeneous unit among the TPC units studied this year. Also, interestingly, a great number of astragali were discovered among the ceramics in the cluster mentioned above. It seems possible that a continuation of this cluster found in the last days of 2012 may be found in 2013 and that similar to the completed vessel (S.1.) from unit (20255), other vessels may be also completed with sherds what will be unearthed next year.

Even though the 2012 pottery material from TPC has not yet been completely evaluated, the studied units provided mixed material from different periods. However, it can be clearly seen that TPC will become a significant area from 2013 onwards because less disturbed units will be excavated and better contexts will be discovered. These excavations will enable us to understand the latest phases of the Neolithic period, the transition between the Neolithic and Chalcolithic periods and the relations between the East and West Mounds.

As has been stated above, it can be said that almost no material was found in the South and 4040 areas. However, the pottery yet to be discovered the South area will enable us to reach our aim in understanding the development process of the earliest levels.

Duygu Tarkan Özbudak did some studies on the earlier material from the East Mound. As a result of a personal interview with Burcu Tung, the field director of the North Area, the material that was found in two rather large middens in the North Area, one excavated in 2003 (Sp.226), and the other in 2006-2007 (Sp.279), was reanalysed based on the units they were found in. The aim was to understand the inner stratigraphy of the middens and to give the excavators auxiliary information on the pottery features. The conclusions were presented to the excavators as a report.

Duygu considered whether there was a change in the dimensions of the pottery from the earlier levels relative to the later levels. There are examples of complete vessels that suggest a decrease in dimensions, especially in cooking pots. However, the scarcity of complete vessels makes it very difficult to prove this change by various analyses.

In this respect, it was decided that the evaluation would be done according to the base angles and starting from the type groups, certain intervals for the base angles were determined. After developing these data, the groups were evaluated according to their frequency and their changes regarding the levels between the areas. However a consistent change was not observed. This change will continue to be observed next year using different strategies.

Also this year, as a result of a collaborative work of Serap and Duygu, a new ware and shape typology terminology was developed for the new database after all the ware and shape typology terms suggested by various scholars were put forth as a table and discussed.

The aims of the new pottery team

The new ceramic team aims to focus on various questions and various aspects regarding the Neolithic pottery studies of Çatalhöyük and the Anatolian plateau.

* The investigation considers the whole pottery sequence of East Çatalhöyük and some specific issues related to this sequence such as:

The latest phases of the pottery sequence at Çatalhöyük

The transition period in Levels VIII/VII and the adoption of new technologies and the development of pottery in the most populated Level VII/VI (e.g., Why did the Çatalhöyük people start using Dark Gritty Ware and hole-mouth jars?)

The earliest examples of pottery above the Aceramic levels (first innovation)

The relation between the latest phases of the Neolithic in the East and West Mound and the clues for this issue obtained from pottery on the East mound

* The investigations also consider the function of some pottery form types through the entire Neolithic phases of Çatalhöyük by contextual and residue analyses and by ethnoarchaeological and experimental studies.

Surface treatments (slipping, scraping, burnishing techniques)

Differentiation in the technology, form types, quality and quantity of pottery between the North and South and the houses, and the pottery characteristics in special buildings.

Variation in the technology, form types, quality and quantity of pottery through time (1400 years).

Production and firing conditions and the organisation and labour within the Çatalhöyük people.

Archaeometric analysis of the latest phases of Çatalhöyük pottery.

* The position of pottery in relation to the Çatalhöyük "art".

* Interaction world of Çatalhöyük in its time and environment based on pottery evidence.

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12. Catal Figurine Report 2012

Lynn Meskell (1), Carolyn Nakamura (2) and Lindsay Der (1)

(1) Stanford University, (2) Leiden University

During the 2012 season some 295 figurines were recorded encompassing this and previous years. Many of these came from heavy residue backlogs or were retrieved from other materials including ground stone and faunal. There were 117 figurines recorded from the 2012: 86 of those were zoomorphic (73%), 23 abbreviated, 4 anthropomorphic examples and the rest were classified as non-diagnostic. The vast majority of the zoomorphic examples were horn fragments, comprising 60 in total.

There were several notable finds from this season's excavations. From South M, Space 470, from a layer of infilling, figurine 19390.x3 depicts a very bulky quadruped quite probably a bear (Figure 12.1). It has a long snout which points upwards as if sniffing and very reminiscent of a bear's behavior. The ears are small and flattened to the side far back from the head. It is chipped on left side of face but overall is very well preserved. Short legs make the body appear very close to the ground and thus accentuate the heaviness of the animal. The body shape is very bear-like, and the coat and bulky form of the animal constitutes a single rounded appearance. The tail is also bear-like: it is short and close to the body, but still emphasized as with almost all quadrupeds.

Figure 12.2. Bear figurine 19390.x3

Figure 12.1. 20171.x1 anthropomorphic figurine.

From TPC Space 486, a midden, 20171.x1 is a heavily gouged and lumpy anthropomorphic figurine of a human (Figure 12.2). While it has no obvious genitalia, it may well show a beard given the very prominent jaw area, but no other marks identifying possible sex. It is broken at nose that was originally quite large and probably elongated. The ears are large and half-moon shaped. The arms are folded into chest but not crossed: they were squished into place rather than being shaped separately and in a detailed fashion. The buttocks are large and flattened, forming a rectangular shape. As with many anthropomorphic forms across the site, the stomach protrudes with a possible navel marked,

although since the figurine is worn it is difficult to be certain. Fingerprints are visible on right leg as well as both sides of neck/shoulders. The head is disproportionately small for the volume of the body. The back has slight sway but is blocky and undifferentiated. There were also visible white inclusions, probably plaster.

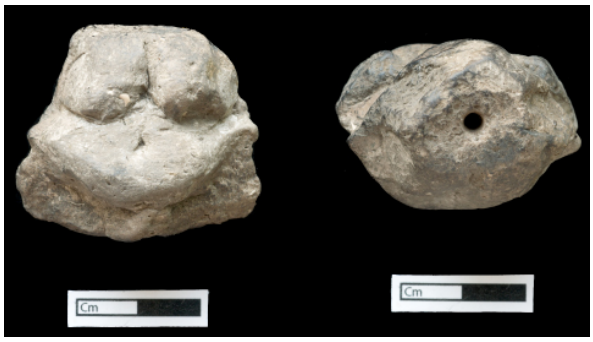

Figure 12.4. Female figurine 20215.x1

Also from the midden in Space 486, 20215.x1 is a figurine depicting a corpulent, rounded female with a dowel hole for a detachable head. There is a clear depression where the head would have sat. The breasts are large, pronounced, drooping breasts but are well-defined. As is the pattern (Nakamura & Meskell 2009), the stomach is large, dropping and protrudes with clear navel distinguished by a hole. The buttocks are large and emphasized with a line. The legs are folded unnaturally at the sides, much like the skeletal figurine from 2005 (12401.x7). The hip bone is emphasized, suggesting again this focus on the fleshed and boney elements of the person (Meskell 2008). The base of the figurine is triangular in shape.

Figure 12.4. Phallic figurine, 18952.x5

Finally, 18592.x5 from Building 79, Space 134, was excavated from fill in 2010 but only seen in 2012 (Figure 12.4). This is a very phallic form that sits or stands upright on a base. The figurine is detailed with an emphasized glans and foreskin, and reminiscent of other examples in stone such as 1505.x1 and 4116.D1. What is striking about most of the phallic examples we have from the site is that they were crafted as single, separate, free-standing, or disembodied objects. With the exception of one possibility (18545.x1), we do not tend to find anthropomorphic figurines showing the penis on the body of a male at Çatalhöyük. In contrast, we have a few female examples recorded fully (n=5) that show the pubic triangle. It seems significant that the penis can be a stand alone representation or embodiment, whereas the vagina cannot. Similarly, the vagina can be shown as part of the body whereas the penis cannot. Not to sounds anachronistic, but as many feminists have long argued the penis, or rather phallus, comes to be an external, separable signifier that symbolically stands for much more than the physical penis.

Ongoing research

This year we also continued with individual research topics. Meskell continued with some of the work developing out of the collaboration with zooarchaeologist, Dr Louise Martin. This work has been published for 2012 in Cambridge Archaeological Journal. Related work examines the extent of appreciable differences in the treatment and fashioning of bodily forms. Several animal taxa such as deer, goats, dogs, bear, wolves and horses were crafted with exquisite care. The horns and beards of goats; the tails, muzzles and swayed backs of horses; the upright tails and attentive postures of dogs; the ears and snout of boars; were given particular attention and

detail. A small subset of these animals within the larger zoomorphic assemblage (n= 1320) may point to their rare and special sightings in the landscape. Tails, tusks, horns, ears and beards are extremely small bodily features to mold, many less than 1cm long.

Many of these bodily features are also very finely modeled as opposed to the bodies of larger quadrupeds like cattle (Martin & Meskell 2012). More contrasting still is the fine detail and smooth modeling of animal species as compared to the anthropomorphic clay figurines (n= 204), those depicting the most detailed human bodily characteristics. While 33% of the animals (n= 438) and 32% of the humans (n=66) could be described as 'finely modeled' the difference lies in the specificities of detail rendered. Following Bennett (2010), the notion of the animal assemblage materializes their emergent properties as well as the interactions betweens humans and animals. Figurines encapsulate the idea of making something happen, possibly impacting the trajectory of the humans and non-humans alike.

Human heads, when present, do not depict full facial characteristics, sometimes hair is indicated, the nose is indicated to lend a profile, less frequently the ears and mouth, and typically the eyes are omitted. Heads of course can be detachable and those examples where the head could be removed or affixed by a dowel, the bodies are extremely corpulent, often with protruding stomachs, buttocks and flattened breasts and shown seated. The individual heads found have some facial features but are caricatures rather than naturalistically portrayed. This compared to the fine rendering of a deer with its holes for removable antlers (12394.H1), the snout, ridged back, short tail and rounded ears of a boar/pig (12980.H1), the tail, beard, horns and ears of goats (2250.X2, 19305.X5, 19305.X3, 999998.H60) and the stocky bodies, upright tails and remarkably alert postures of dogs (12648.X6, 15675.H4, 19101.H3, 18154.H3, 19342.X16). Clay captured a species-specific animality (Martin & Meskell 2012): the bodily demeanors, behaviors and physical characteristics of specific, and certainly not all, animals in their immediate landscape. There is a kind of bodily fascination, a loving attention to heads and tails, to animal indicators and also their being that does not easily transfer over into the human world.

We have previously argued against associating figurine practices with narratives and ideas of the Mother Goddess given the lack of evidence for this in the current excavations. However, we have also argued that the Çatahöyük figurine-making addresses a range of concerns and some of these may have included more ritualized practices. While we would not argue that figurines primarily functioned in a magical or sacred capacity, it is likely that they articulated a form of ritualized practice at the level of habitual or even daily life of inhabitants at the site.

Carolyn Nakamura and Peter Pels (forthcoming) have recently explored certain 'magical' gestures that may have informed various practices at Çatahöyük. One set of coupled activties is revelation and concealment. Such acts often involve the crossing or breaching of surfaces through burial/embedding and retrieval in or across surfaces; however, they can also involve the *transformation* of a surface. For instance, the abbreviated, expediently made clay figurines, most commonly found in rubbish and dumps, may also articulate a kind of magical economy. Forming – or revealing – a human (or animal) figure from a clay lump, while perhaps requiring minimal skill, does assert a distinctive kind of creative agency through the mimetic act. Some scholars have interpreted these figurine types found primarily in midden and dumping contexts as 'wish-vehicles' that were quickly made and perhaps as quickly discarded (Voigt 2000; Hodder 2006,

190; Pels 2010). Again, the focus settles on the process of creation or rendering form from an 'unformed' surface or medium, rather than on the final product (Meskell et al 2009). As such, this kind of figurine practice could indeed articulate a magical or ritualized process (cf. Bell 1992), whereby the creative and destructive act embodied by the figurine process rendered the human maker a powerful agent in that context (see also Nakamura 2004, 2005). Not insignificantly, the rather ordinary and mundane act of creating form from clay is coupled with the divine creative power in various ancient texts (see for example the *Enuma Elish* (Sumero-Babylonian), and *Surat alMu'minun* (Qur'anic).

Figurines as objects are also associated with ritualized practices that appear to mark certain events, spaces or moments. The archaeological category of clusters, which the Hodder excavations have been recording from the outset, includes many deposits that appear to have been intentionally placed. Nakamura and Pels (forthcoming) examined this subset of clusters and divided them into non-ritualized, possibly ritualized, and likely ritualized deposits. Their preliminary analyses suggest that figurines commonly appear in in the more ritualized contexts, along with other materials such as antlers, stone tools, human skeletons, animal skulls, blades, axes, pigment lumps, and bone tools (Nakamura and Pels forthcoming, Table 3). The objects found in these kinds of deposits may have articulated or accumulated some kind of social power or significance more generally.

Figurines then should not be excluded from considerations of ritual power and agency. While these materials should not be exclusively defined in such terms, there is some evidence of figurines participation in certain ritualized or even magical registers of social life.

The figurine data, particularly that pertaining to the zoomorphic figurines, will also be a component of a dissertation research project by Lindsay Der (Stanford University). This project investigates how human-animal relations at Çatalhöyük may have played a role in social organization at the site. By using a Geographic Information Systems Analysis (GIS) it is possible to synthesize and map various datasets related to animals at the house level. These datsets include the iconography (such as wall paintings, reliefs and figurines), architecture, and faunal remains. Currently, there is no evidence of distinct social stratification at the site, yet there are clear differences between houses, namely in the degree and kind of elaboration. As house elaboration and ritual frequently centers on animal themes and associations, it seems likely that this may have been parlayed into the spatial patterning of houses with certain animal representations and objects. This patterning could in turn lead to the identification of intra-community social groups based on differential relationships between the residents of Çatalhöyük and particular animals.

In the 2012 field season, the first stage of this project took the form of a pilot study comprising of three houses. These houses were chosen as they are all from the same occupational level and have similar architectural features. Data was gathered in the field to be analyzed and mapped post-field. The results of the pilot study will be presented in a poster session at the 2013 Society for American Archaeology annual meeting in Honolulu, Hawaii.

Additionally, the zoomorphic horn figurines and horn cores were mapped using GIS in order to see if there is a relationship between the actual remains of animals and animal representations of horns. Figurines tend to occur in external and secondary contexts, in middens and fill,

suggesting that these objects were not highly valued but were instead alienable possessions (Meskell et al. 2007; Meskell et al. 2008). Thus it may be possible to see if faunal remains (here the horn cores) may have been regarded in the same way.

Based on the plot (Figure 12.5), there does not seem to be a consistent one-to-one relationship across the site. For both areas the horn cores and horn figurines seem to cluster around certain buildings, but in other parts of the site, distribution is more sporadic. Roughly speaking, in the South Area, clustering is most concentrated in the southern excavation units whereas in the North Area, this occurs more in the northern units. Furthermore, the highest densities of both figurines and faunal horns are in the South Area. This seems to suggest that these objects played different roles for inhabitants in different zones of the site. For instance, perhaps horn cores were considered alienable objects akin to the figurines in certain houses whereas in other houses they were not. Further investigation of associated objects and animal representation in high-cluster locales would be useful in understanding the range of practices involving figurines and faunal remains, providing insight into human-animal relations at Çatalhöyük.

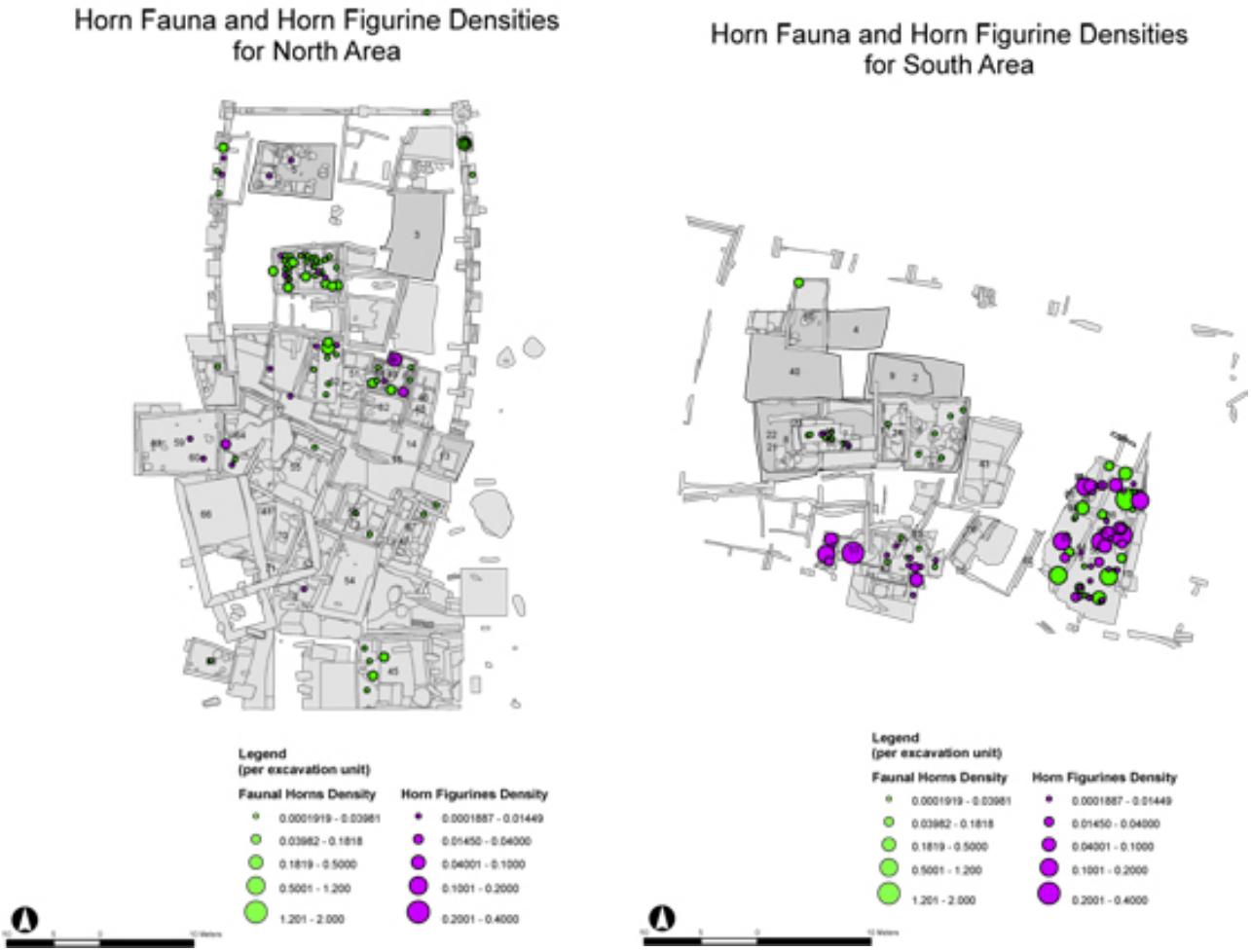

Figure 12.5. Fauna and horn figurine densities

Some caveats should be noted when interpreting the map. As buildings have been differentially excavated, densities rather than frequencies were used. Only finds from the 2000-2012 field seasons were included, as total volume deposits for excavation units are not available for years before 2000. Although the figures for deposits from 2000 are considered relatively reliable,

there is inconsistency in the methods used for calculating this figure. Some units were based on an extrapolation of volume from area; some were actual measured volumes while others were ballpark estimates. Additionally, some excavation units are missing total volume deposits. Choice of where to excavate, the rate and extent to dig, and recovery methods may also bias samples. Horn cores have particularly poor preservation properties. Lastly, this map includes data from numerous occupational layers which make up a fairly large stretch of time. Part of the problem here is that the chronology for the site is a work in progress and there are still outstanding radiocarbon dates for which the team is awaiting. Depending on which datasets are desired, sample sizes for given levels may be too small to be significant anymore, thus making a level by level plot impractical.

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13. Chipped Stone Archive Report 2012

Tristan Carter, McMaster University

This short report details the work undertaken by the Chipped Stone Team (East Mound) during the 2012 season. The highlights of the year included the discovery of two obsidian mirrors from a burial in the North Area, the first examples to be found in an undisturbed Neolithic context since the 1960's excavations. From the South Area we have numerous examples o special objects being consumed in ritualised abandonment deposits, not least large quantities of projectiles, while from the earliest occupation phase of B.97 we have three obsidian hoards, dominated by ovate spearheads.

North Area

A number of trenches were opened in the North Area this summer, most of which remain works-in-progress and will be discussed in greater detail when completed. U.20449, a midden from Space 490, produced a significant quantity of chipped stone, the material dominated by Göllü Dağ obsidian (c. 85%, mainly the blue-black Kaletepe-Kömürcü products), primarily in the form of short / irregular pressure-flaked bladelets, and blade-like flakes, plus a couple of related / exhausted cores. There were also two thinning flakes from Kaletepe bifaces. The structure of the assemblage is directly comparable to that from neighbouring Space 60 and to a certain extent that from adjacent B.77; as such this material can be chronologically placed into North.G. U.20472, another midden from Space 490, seemed to be slightly later in date, as evidenced for example by a rise in the relative proportion of Nenezi Dağ obsidian (25%), and the presence of a small quantity of pressure-flaked products. Stratigraphically this should relate to North.H.

Figure 13.1. Obsidian mirror 19447.x3. Notice the red and blue pigment on its back.

By far the most significant sets of material from the North Area in 2012 came from a series of burials in Space 77. From F.3630 a complete and unused 10.2cm long Nenezi Dağ pressure blade has been included as a grave good along with a great many beads, one of only a handful of burials we have on site that include deliberately interred chipped stone implements. Given the technology and raw material, the burial should be placed no earlier than North.H.

The most spectacular finds however, were two complete obsidian mirrors associated with burials F.3630 and F.3684 (19447.X3 and 19447.X4 [Figure 13.1, also see Figure 1.3 & 2.7]); these were the first examples to have been found in a Neolithic context since the 1960's excavations.[2] The first was approximately 9cm in diameter and sub-conical in form, having been made from a

[2] Vedder, J.F. (2005), 'The obsidian mirrors of Çatalhöyük', in I. Hodder (ed.), *Changing Materialities at Çatalhöyük: Reports from the 1995-1999 Seasons*. McDonald Institute Monographs and BIAA, Cambridge: 597-619.

block of Nenezi Dağ obsidian. It is nigh complete, with the exception of two flakes removed from the upper margin. U.19447.X4 is also complete, a flattened cone in form, measuring 8.5-9.5cm in diameter; it too was made from a nodule of Nenezi Dağ obsidian. A detailed study of their form, and technology has been made and is being prepared for publication elsewhere.

South Area

As with the North Area, a lot of the contexts being investigated remain works in progress, so only a brief synopsis of the major discoveries is provided here.

From B.89 (South.N) a small Kaletepe obsidian (Göllü Dağ) projectile was found in the building infill (U.18778.X6), one of a great many such examples we find from abandonment deposits on the site, together with a fine 4.55cm long chert perforator. B.76 (South.O) also produced material that appears to have been deliberately left in the structure as part of the rituals surrounding the building's dismantlement and infilling, in the form of a pressure-flaked chert blade left and burnt at the base of a plastered pillar (U.18763.X1). The structure also had a burial containing an adult male (F.3421) who had been buried with a fine chert perforator, as evidenced by the grinding on its tip (U.18489.X1); the piece was also very worn more generally and was no doubt an heirloom when interred. In turn, a ground and retouched large tan chert blade – likely a dagger fragment – was found in tumble from Space 368 (U.18794.X1); the piece was 3.6cm wide, regular and 5.2cm long (originally estimated to have been over 10cm), almost certainly the product of a highly skilled and non-local lever pressure technique.

B.80, another South.O structure, produced a very rich set of 'characterful' objects that appear to have been deliberately included in abandonment rituals, with eight (maybe nine) obsidian spearheads, an obsidian spearhead preform, plus a flint spearhead recovered from closure infill deposits. This is many more than we see in most structures, and not dissimilar to the nine projectiles consumed at the end of the life of another elaborate, burnt structure, B.52 in the North Area.

Figure 13.2. Cluster (20335), *in situ* within B.97. Photo by Jason Quinlan.

From the same stratigraphic horizon is B.97 (South.), a part-truncated structure – its northern end having been dug by Mellaart – that has produced a rich chipped stone assemblage, not least through the recovery of two largely intact sub-floor hoards (Figure 13.2), and the trace of a third. There were also five obsidian projectiles from the final phase of occupation/closure and the subsequent infilling of the structure, items that we again strongly believe were ritually interred. The hoards were located – typically in the 'dirty' southern part of the building, [3] close to fire installations. U.20337 comprised eight large artefacts, three of which were immediately covered for aDNA sampling and were thus not available for

[3] Carter, T. (2007), 'Of blanks and burials: hoarding obsidian at Neolithic Çatalhöyük', in L. Astruc, D. Binder and F. Briois (eds.), *Technical Systems and Near Eastern PPN Communities. Proceedings of the 5th International Workshop. Fréjus, 2004.* Éditions APDCA, Antibes: 343-355.

study this season; the remaining five items were in the form of ovate bifaces made of Kaletepe-Kömürcü/Göllü Dağ obsidian (the largest measuring 11.68cm long), and 'quarry flakes' (thick, partly patinated/natural surface blanks), that represent the raw material for in-house blade-like flake production.[4] These are typical components of these earlier Pottery Neolithic hoards. The second cache, U.20639, was the larger of the two with 15 X-finds, four of which were unavailable to study due to aDNA sampling. The remaining material included complete and fragmentary examples of ovate bifaces made of Nenezi Dağ obsidian, together with a few products. The use of this raw material in this particular form is very interesting, somewhat 'hybrid' in nature, thus fitting in more generally with how this horizon is viewed by us within the overall technological patterning / raw material consumption at Çatalhöyük. Close by these hoards, was a third and smaller example U.20334, with five pieces of obsidian, arguably the remnants of a larger retrieved cache. This comprised biface related material made from Kaletepe-Kömürcü/Göllü Dağ obsidian, plus thicker flakes with patination and retouch that we believe to be ancient workshop debris / tools that were collected at source and transported to Çatalhöyük for re-use.

TP Study

With the final matrix having been produced for the TP stratigraphic sequence, it provided us with an opportunity to reorganise the chipped stone from this excavation area into chronological sequence (Table 13.1).[5] Concerning raw materials, the data fits the general pattern we see at Çatalhöyük throughout the Neolithic sequence, i.e. the great majority of the chipped stone artefacts are made from obsidian, plus a small proportion of chert. In turn, a visual characterisation of the former component would indicate that most of this obsidian came from Cappadocia, albeit with a handful of visually distinct peralkaline (green) products of the Bingöl A and/or Nemrut Dağ sources from eastern Anatolia, some 650-800 km distant as-the-crow-flies. This material is documented at the site in tiny quantities on the East Mound post 6500 cal BC,[6] also being attested on the West Mound in Early Chalcolithic levels (pers. obs.).

Phase	Total CS	Obsidian		Flint	
TP.Q	1287	1235	96 %	52	4%
TP.P	1352	1331	98.4%	21	1.6%
TP.O	1457	1440	98.8%	17	1.2%
TP.N	2495	2431	97.4%	64	2.6%
TP.M	34	29	85.3%	5	14.7%

[4] Carter, T., Conolly, J. and Spasojević, A. (2005), 'The chipped stone', in I. Hodder (ed.), *Changing Materialities at Çatalhöyük: Reports from the 1995-1999 Seasons*. McDonald Institute Monographs and BIAA, Cambridge: 221-83.

[5] The following information is intended as a supplement to the main study undertaken on the TP material by our colleague Marcin Wąs.

[6] Carter, T. Dubernet, S., King, R., Le Bourdonnec, F.-X., Milić, M., Poupeau, G. and Shackley, M.S. (2008), 'Eastern Anatolian obsidians at Çatalhöyük and the reconfiguration of regional interaction in the Early Ceramic Neolithic', *Antiquity* 82(318): 900-909.

Table 13.1: General chipped stone raw material proportions throughout the TP sequence (dry sieve)

Turning to the dominant Cappadocian products, we see that Nenezi Dag products are dominant (Table 13.2), in keeping with what we view in the upper levels of the South and North Areas. A small elemental characterisation project involving TP material has also been recently completed at the McMaster Archaeological XRF Lab [MAX Lab];[7] the results of this study are now being prepared for publication. With regard to the chert component, we view a variety of raw materials and end-products, including some fine retouched prismatic blades. We provide a précis of the assemblages below, starting with the earliest stratum.

Phase	Obsidian	Göllü Dağ	Nenezi Dağ	Bingöl A / NMRD	Other
TP.Q	1225 (1235)*	236 (**19.3%**)	989 (**80.7%**)	-	-
TP.P	1321 (1331)*	242 (**18.3%**)	1079 (**81.7%**)	-	-
TP.O	1432 (1440)*	319 (**22.3%**)	1111 (**77.6%**)	2 (0.14%)	-
TP.N	2411 (2431)*	465 (**19.3%**)	1943 (**80.6%**)	2 (0.08%)	1 (0.04%)
TP.M	29	11 (**37.9%**)	18 (**62.1%**)	-	-

Table 13.2: Quantity and relative proportion of obsidian by level and source based on a visual characterisation study (NMRD = Nemrut Dağ; * - some obsidian not visually characterised as these are at the MAX Lab being elementally analysed).

TP.M

A small assemblage (n=44 [Table 13.1]), dominated by material relating to the manufacture of pressure-flaked blades, involving the use of both Nenezi Dağ and Göllü Dağ raw materials, the former in the majority (Table 13.2). Production appears to have occurred on-site, with exhausted blade cores documented in 'both' Cappadocian obsidians. No projectiles and no obvious opposed platform material. Chert is present in the form of flakes, including some part-cortical material that could be relatively local.

TP.N

The assemblage is very similar to that from TP.M in that it is dominated by pressure-flaked blades and their associated manufacturing debris (though typically for Çatalhöyük, cortical blanks are rare, if not absent). Over 80% of the obsidian is visually characterised as coming from Nenezi Dağ, the remainder from Göllü Dağ (Table 13.2). In both cases we have evidence for pressure blades being made on-site, albeit from a relatively advanced stage of production, i.e. we lack crested blades (this is typical throughout the post 6500 cal BC assemblages on the East Mound), though we have a few secondary series examples with remnant cresting scars. Amongst the Nenezi Dağ assemblage there are a number of exhausted cores, plus core-tablets and rejuvenation flakes from the face of a nucleus, together with less regular end-of-sequence blades; the Göllü Dağ material includes a similar range of material, together with a few wider

[7] http://maxlab.ca

and less regular blades from a percussion technology. There are a handful of opposed platform blades, the majority made of Nenezi Dağ obsidian and modified into projectiles, usually relatively short and with carefully modified tangs (e.g. U.17638.X9, 4.56cm long). One highly distinctive piece made of Göllü Dağ (Kaletepe) obsidian is both tanged *and* barbed, a rare type that may be restricted to these upper levels (U.17637.X10); the significance of the barbs is that this is a feature one associated with the killing of people, rather than animals.[8]

Amongst the Göllü Dağ obsidian is a single flake that has been carefully ground on both faces and margins; it conceivably represents a preform for a piece of jewellery, examples of which are better known from SE Anatolia during the slightly later Halaf period, as for example at Domuztepe.[9] The two green (peralkaline) pieces of obsidian from Bingöl A and/or Nemrut Dağ were both in the form of broken pressure-flaked blades, one with 90% covering dorsal retouch (U.13532) whose function is unclear (it is too curved longitudinally to be a projectile), the other

The chert artefacts again embodied a variety of raw materials that represent both relatively local resources (often represented by cortical blanks), plus finer quality blade products that were almost certainly procured ready-made, quite possibly of distant origins. The latter implements were almost invariably modified into various retouched tool-types, including perforator / drills, one of which (U. 7621) might be from an opposed platform technology, as was a bifacially modified projectile (U. 7623). One thick blade had been modified into a narrow tanged projectile with covering bifacial retouch (U.13532.X43, 4.97cm long). Some blades were clearly pressure-flaked in a manner analogous to how obsidian was being mainly worked at this time, while there are also some significantly wider blades that derive from yet another technique, conceivably the highly skilled lever-produced mechanism, a method that was introduced to SE Anatolia from the east in the 9th millennium cal BC.[10] The largest blades came from the tomb fill (Space 327) – a number of which are now stored in Konya Museum and not detailed in this report – up to 12.4cm long percussion blades, with heavy marginal retouch and use, possibly butchery knives of some form. Interestingly, as we see with many of these large chert 'characterful' objects,[11] some of these large blades were heavily worn and dulled, obviously heirlooms of some antiquity by the time they were deposited in the burial chamber.

TP.O

Structurally the TP.O assemblage closely resembles that from TP.N (Tables 13.1-2). The dominant Nenezi Dağ obsidian component is once again comprised mainly of pressure-flaked blades, together with a few related exhausted cores, plus rejuvenation material such as core tablets and flakes from the face of a nucleus. Smaller quantities of these items are also evidenced in Göllü Dağ obsidian. Similarly, there is evidence in both obsidians for a few larger

[8] C. Knüssel pers. comm.

[9] Healey, E. and Campbell, S. (2009), 'The challenge of characterising large assemblages of exotic materials: The case study of the obsidian from Domuztepe, SE Turkey', *Internet Archaeology* 26.

[10] See Altınbilek-Algül, C., Astruc, L., Binder, D. and Pelegrin, J. (2012), Pressure blade production with a lever in the Early and Late Neolithic of the Near East', in P.M. Desrosiers (ed.), The *Emergence of Pressure Blade Making: From Origin to Modern Experimentation*. Springer, New York: 157-79.

[11] Carter, T. (2011), 'A 'true gift of mother earth': the use and significance of obsidian at Çatalhöyük', *Anatolian Studies* 61: 1-19 [5].

percussion blades for which we continue to lack evidence for associated manufacturing debris, i.e. they were likely procured ready-made. A handful of these pieces derive from opposed platform cores, usually retouched into projectiles (as before, the smaller tanged varieties); there was also an upsilon blade made of Göllü Dağ obsidian, a notably late example of this technologically diagnostic blank (U.13570). There were also a small number of large unipolar percussion blades, together with a few large scrapers made from thick core rejuvenation flakes. Two pieces had traces of grinding and polishing, one a 1.93cm long Nenezi Dağ pressure-flaked blade with ground margins from use-wear (U.15261.X26), while a large percussion blade-like flake that had been heavily retouched on both margins to produce a tip for perforating/drilling (end snapped off) has clear traces of grinding on the underside. In both instances the abrasion on these implements appears to be from use-wear, rather than deliberate modification of the piece itself. Finally, TP.O also produced another two pressure-flaked blades of green Lake Van region obsidian, one with a part-cortical surface.

The chert assemblage contained a similar range of raw materials and end-products as before, with a few pressure blades, plus percussion examples, some radiolarite flakes, a core fragment of an orange-brown chert, and the distal tip of another blade core of grey-brown chert.

TP.P

The assemblage from these deposits is much the same as before in terms of raw material relative proportions (Tables 13.1-2), the techniques used to work them, and the various tool-types represented. Pressure blades continued to be made on site using both major Cappadocian obsidians, with exhausted cores, rejuvenation material and numerous fragmentary end-products. While dominated by the translucent purple-grey raw material we associate with the Kayırlı outcrops of Göllü Dağ, there were also a few of the blue-black variants from Kömürcü. Amongst the minority larger percussion blades there were the usual examples of projectiles (again we have the impression that there is a diminished number compared to what we see in the rest of the South Area sequence), with the points again being relatively small, and often tanged. No polished / ground items were recorded, nor any Lake Van obsidian. The amount of chert is low, with two pressure blades, a blade-core fragment, some burnt flakes, a bladelet, two wider percussion blades (one retouched into a perforator), and a number of flakes.

TP.Q

The chipped stone of uppermost later Neolithic stratigraphic horizon studied this year (in 2013 TP.R will be completed), displayed significant continuity from the material of the preceding stratum (Tables 13.1-2). The on-site manufacture of pressure blades using both Nenezi Dağ and Göllü Dağ products continues, with cores, rejuvenation blanks and end products attested in both raw materials. There continue to be a few wider percussion blades, but it is uncertain as to how many, if any, of these derived from opposed platform traditions. Projectiles are extremely rare, while Lake Van products are again absent.

Various cherts are represented, the products including a backed bladelet, both pressure and percussion blades, and a quantity of part-cortical flakes that we assume to be from more local raw materials. Some of the chert blades are burnt and/or highly worn from long-term circulation. Cores are rare, but there are some rejuvenation pieces, suggesting that as

previously, not all chert blades were accessed in a ready-made state, but that some raw materials were being knapped on-site.

To summarise, the TP sequence presents us with a not insignificant amount of continuity from the later levels of the South Area sequence (South.S), and the North Area (North.I), in that they are (a) dominated by obsidian, (b) dominated by Nenezi Dağ products, (c) dominated by artefacts deriving from pressure blade traditions, the technology having been articulated on-site (using both Cappadocian obsidians) from an advanced stage of core preparation / reduction, (d) the lowest levels of the TP sequence also contain a small amount of opposed platform blades made primarily of Nenezi Dağ obsidian the blanks likely having been procured ready-made, (e) there are also handfuls of wide unipolar percussion blades (again non-locally made), plus the suggestion of a very few specialised lever-produced pressure blades, (f) much the same tool types, including a few obsidian blades with heavily ground edges that were probably used for drilling / carving stone.

There are also a handful of imported Lake Van pressure blades, that while absent from the North.I middens and South.S deposits, are nonetheless noted from later Pottery Neolithic contexts elsewhere on the site, not least B.63 excavated by the Istanbul Team.

Looking forward in time to the relationship between the Late Neolithic TP material and that from the Early Chalcolithic West Mound, a few preliminary statements can be made. Firstly, there is a significant difference in the relative proportion of Cappadocian obsidian between the two, with a shift from a dominance of Nenezi Dağ products in the earlier material (~80% [Table 13.2]), to a 50 : 50 ratio by the Early Chalcolithic. Secondly, over the long term one appears to view a diminishment in both the relative number of projectiles, together with a reduction in their size and form, with the TP assemblages containing a few small tanged variants (one wonders if now almost all are arrows, rather than spears), while the West Mound produces a few tanged points, together with a handful of trapezoidal arrows. Thirdly, we witness the gradual loss of the large opposed platform blade tradition, while conversely the wide percussion unipolar technology continues, including a few whose scale and regularity of form suggests lever produced pressure products / Canaanite blades (something we first witness in the later Pottery Neolithic strata of the South Area and North.I middens).

In terms of consumption, one thing we have yet to recover from the TP sequence are sub-floor obsidian hoards, a practice that seems to have been abandoned post-6500 cal BC (similarly none are recorded from the West Mound). While this negative evidence is in keeping with what we see in the uppermost strata of the South Area / North sequence, there are also clear differences in practice between the later Pottery Neolithic and Late Neolithic, specifically with regard to the deposition of 'characterful' objects. During the later Pottery Neolithic we have numerous instances where skillfully made, distinctive implements – not least projectiles – were left on a building's floor, or within a bin or some other construction, in the final phase of activity prior to the building's abandonment / burnt destruction, and their subsequent infills.[12] Such material seems to be absent from the TP buildings, suggesting a new set of abandonment practices and

[12] See Carter (2011: 8-11), and Twiss, K.C., Bogaard, A., Bogdan, D., Carter, T., Charles, M.P., Farid, S., Russell, N., Stevanović, M., Yalman, E.N. and Yeomans, L.), 'Arson or accident? The burning of a Neolithic house at Çatalhöyük', *Journal of Field Archaeology* 33(1): 41-57.

the reconfiguration of the social roles of skillfully crafted and idiosyncratic stone implements.[13] This is not to say that certain tools did not play a dynamic role in the construction, maintenance and representation of particular social identities, far from it; indeed we have the deposition of projectiles and large butchery-knives, some clearly being heirlooms, in the burial chamber from Space 327.

TPC Study

This was the first year of excavation in this area of the site, the aim being to link the TP and South Area sequence. We dedicated a number of priority tours to midden deposits from this area to gain a rapid overview of the assemblages' nature from these periods. Unfortunately virtually all of these deposits were mixed,[14] containing not only historic material, but also a melange of later Neolithic and Chalcolithic finds (D. Tarkan pers. comm.). Thus it is impossible at this stage to say anything meaningful concerning the chipped stone from these strata, as most of our artefacts simply cannot be dated that specifically on their own. The general *impression* that one has – for what it is worth – is that these mixed later Neolithic and Chalcolithic strata are dominated by the products of pressure-flaked blade technologies (more than one is attested on the basis of size and form), with Nenezi Dağ obsidian dominant. There are few if any projectiles, while opposed platform blades are rare, or absent.

Other Projects

Alongside the main study of the East Mound chipped stone are a number of more focused research projects. In 2012 we were joined by Dr. Christina Lemorini of Rome University, who will be running a new use-wear analysis programme at Çatalhöyük; in consultation with a number of the team, not least Lilian Dogiama, Dr. Lemorini is planning a number of different research strategies to investigate various aspects of tool function at the site. These variously include a use-wear analysis of those implements currently (typologically) defined as 'projectiles', together with diachronic considerations of other tool-types and considerations of functional :: raw material relations.

Lilian Dogiama, a PhD candidate from McMaster University, continued her doctoral research (*Points of Reference: Projectiles, Hunting and Identity at Neolithic Çatalhöyük, Turkey*), working through a multi-attribute study of projectiles from the upper half of the East Mound sequence. Her work also involved a pilot study dedicated to the extraction of aDNA from projectiles found in the 2011-12 seasons (with a protocol developed for in-field handling and associated soil sampling), the aim being to run these analyses – of samples extracted from the surface of these weapons – at the McMaster Ancient DNA Laboratory. Lilian, along with Arzu Demirergi of the faunal lab, also organised an experimental obsidian knapping session (carried out by Matteo Pilati), the aim being to produce a series of blanks to be used in butchery experiments and use-wear analysis in the 2013 season.

[13] See Gero, J. (1989), 'Assessing social information in material objects: how well do lithics measure up?', in R. Torrence (Ed.), *Time, Energy and Stone Tools*. Cambridge University Press, Cambridge: 92-105.

[14] Including 20124, 20127, 20215a, 20215b, 20232.

Danica Mihailović, a long-term associate-member of the team from the University of Belgrade, also began her own MA research project this summer, dedicated to the analysis of opposed platform blade technologies throughout the sequence. This is a minority component of the Çatalhöyük chipped stone assemblage, almost exclusively articulated via obsidian, a technique that we first view in the Aceramic sequence, in essence an off-shoot of Levantine PPN traditions (via Cappadocia). The large blades that derive from this technology were preferentially used as blanks to make projectiles, and we think were more often than not manufactured at quarry-based specialist workshops (Carter 2011: 10). Danica will be detailing their prevalence, range of products and associated manufacturing debris (if any), and forms of modification / modes of on-site consumption through time, locating her results within a broader regional consideration of this technology.

Finally, three McMaster undergraduates – Deanna Aubert, Sean Doyle and Rachel Ireson – worked closely with Lisa Guerre in the re-inventorying of all chipped stone generated by the CRP since 1993, reorganising the material by stratigraphic level and context. This thankless task was undertaken with great patience, professionalism and humour, with the organisation of each building contents further allowing us to study in greater detail the evidence for the stratigraphic position of all hoards, and the evidence in time and space for the manufacture of projectiles. This data has proved to be enormously interesting, and will provide the basis for a more general examination of the nature of household *foundation* at Çatalhöyük, a version of which we hope to present at the 2013 SAA's.

Team presentations and publications

Since the last Archive Report detailing the work of the Chipped Stone team (East Mound), our members have published a number of Çatalhöyük-related papers and given project-oriented presentations; these include:

Carter, T. (2011), 'A true gift of mother earth: the use and significance of obsidian at Çatalhöyük', *Anatolian Studies* 61: 1-19.

Carter, T. and Underbjerg, H.M. (2012), 'The flaked stone assemblage from the BACH Area', in R. Tringham and M. Stevanović (eds.), *The Last House on the Hill: BACH Area Reports from Çatalhöyük, Turkey*. Cotsen Institute of Archaeology Publications, Los Angeles: 391-414.

Carter, T. and Milić, M. – 'The consumption of obsidian at Neolithic Çatalhöyük: A long-term perspective', *7th International Conference on the Chipped and Ground Stone Industries of the Pre-Pottery Neolithic*, Barcelona, Feb. 2012-11-26.

Le Bourdonnec, F.-X., Carter, T., Poupeau, G. and Dubernet, S. (2011), 'Provenances des obsidiennes prehistoriques: Une strategie analytique en Anatolie', *Archéométrie 2011. XVIIIe Colloque du GMPCA.* Liège, April 2011.

Dogiama, L. – 'Distinguishing between arrowheads and spearheads: The case of the Çatalhöyük projectile points', *7th International Conference on the Chipped and Ground Stone Industries of the Pre-Pottery Neolithic*, Barcelona, Feb. 2012-11-26

14. Ground Stone Analysis

Christina Tsoraki (University of Sheffield)

Following some changes in the organizational structure of the Ground Stone Team the main aims of the 2012 season were a) to re-inventory all excavated material (1993-2011); b) to re-organise the material excavated between 2009-2011 in crates according to buildings and spaces, c) to review and update the protocols for the recovery, storage and analysis of ground stone artefacts; and d) to implement changes to the recording system and the ground stone database. In addition, the preliminary analysis of the ground stone assemblage from Building 80 was completed. A new pilot research project on starch analysis of grinding tools was initiated in collaboration with Dr. Huw Barton (see below, Ch.21). Finally, I was involved in the priority tours and analysed some of the material from the 2012 priority units.

Research aims

The 2012 field season saw some changes in the organisational structure of the ground stone team and the research objectives for the current excavation and publication phase of the project. The new phase of research in the Çatalhöyük ground stone technologies intends to extend the research conducted by Karen Wright (Wright forthcoming; Baysal and Wright 2005) and develop some news lines of enquiry with regards food and craft technologies and the social practices surrounding the use and discard of ground stone artefacts. The research aims for the current 5-year phase of the project is to fully integrate the results of the ground stone analysis with the work conducted by other specialists on site (e.g., human remains, botanical and faunal remains, shell, chipped stone, figurines and pottery) in order to address issues such as procurement, transportation and perception of materials, mobility, health issues (e.g., activity markers, dental microwear), types and scale of food processing, and cross-craft interactions (cf. Tsoraki 2011). An exploration of the technological and social aspects of cross-craft interactions provides an opportunity to integrate traditionally separated media-based categories and move towards an understanding of how material categories may have been constructed in particular social, chronological and spatial contexts. This close reading of materials will allow us to explore indigenous taxonomies and classifications.

To this end, during the 2012 summer season meetings were held with all other team labs in order to identify key overlapping research issues which could be addressed following multiple lines of enquiry. In addition, I have established a collaborative project with Dr. Huw Barton (University of Leicester) that explores the potential of starch analysis on grinding tools (see Starch report), while a project focusing on microwear analysis of different ground stone categories is due to begin in 2013.

Finds processing and management

The most substantial work accomplished during the 2012 season (from June 27th until July 22nd) involved the review and design of protocols for the recovery, storage and analysis of the ground stone assemblage. A review of the existing policies regarding finds processing and management, in collaboration with the finds officer and the field directors, indicated the need for the design and implementation of an updated strategy for the systematic recovery, washing and storing of ground stone artefacts. It was agreed that a preliminary sorting of all ground stone material into worked and unworked stone—to the extent that was feasible—would take place on site during excavation, while X find numbers would be given to all types of ground stone artefacts

(implements, ornaments, vases) by all excavators in a consistent and systematic manner. When objects with possible residue traces on their surfaces (e.g., colour staining) are recovered during excavation, excavators were advised to avoid unnecessary handling of the artefact and in particular to avoid touching use surfaces. Objects that will be subjected to residue analysis will be bagged separately and will be left unwashed. In order to improve the systematic recovery process of ground stone material, I organised a tutorial for the excavation teams focusing on practical issues regarding the identification and recovery procedures for ground stone during excavation. In the coming years similar tutorials will be given to the excavation teams at the beginning of each new field season as a standard practice.

Figure 14.2. Members of the Çatalhöyük Research Project inventorying crates of ground stone material.

Figure 14.2. The re-organised ground stone crates (1993-2011) stored in the new storage depot.

One of the main priorities for the 2012 season was to re-organise the crates of ground stone material excavated between 2009 and 2011 according to buildings and spaces with the aim to focus on the detailed study of the assemblage from 2013 onwards. After discussions with other project members—principally Lisa Guerre (Finds Officer) and Ian Hodder—it was agreed that it was absolutely necessary to create an up-to-date complete inventory of all ground stone crates containing worked and unworked stone that was excavated between 1993 and 2011. This huge and well-orchestrated undertaking was only made possible through the kind participation of all members of the excavation and laboratory teams (ca. 120 people) under the supervision of the Finds Officer, Finds Assistants and myself (Figure 14.1 and Figure 14.2). I would like to thank all the members of the Çatalhöyük Research Project for their help with this task. The crate register on the Çatalhöyük finds database system will be updated over the winter period by Lisa allowing for an accurate record of the contents of each ground stone crate which will contribute to the swift location of the material in the depot for future research.

Database: In consultation with the database manager and after discussions with other specialists (e.g., pottery, archaeobotany, phytoliths and starch analysis, faunal and human remains) a series of changes were implemented to the ground stone database and the recording system in the way different attributes were recorded. This is necessary in order a) to better aid statistical analysis and quantification of results, and b) to move towards the integration of the ground stone analysis with other data sets, promoting collaborative research. Emphasis is placed on the systematic recording of use-related attributes and the characteristics of the use-faces of different artefact categories including information on maintenance strategies, the systematic recording of fragmentation patterns and the overall state of artefact preservation. This will allow us to investigate patterns of deliberate destruction of objects through intentional breakage or

fire and the social implications of such acts. A small number of artefacts representing different object and material categories were recorded on an offline database in order to test the workability of the database. Due to time restrictions, it was agreed with the database manager that the fully-fledged version of the database will be available on ACCESS in 2013 when the database will be linked into the central Access-based project database system.

Analysis of ground stone material

Building 80: Among the aims for the 2012 season was to start the assessment and recording of backlog material from 2009-2011. Preliminary analysis focused on material from Building 80 located in the South Area that has been assigned to Hodder Level South.O. Building 80, a well preserved partly burnt structure, seems to have been cleaned out prior to abandonment. Two rooms have been identified: Space 135 to the north (main room) and Space 373 to the south (Regan 2010, Archive Report).

Overall, the material from Building 80, that comes mainly from the 'backfilling' sequence, survives in a very fragmentary condition. The majority of the material is either natural stone (i.e. mainly small-sized pebbles that are too small to have been intended as raw material for the production of various ground stone artefacts such as polishers and beads), fire-cracked rocks, or fragments of different types of andesite grinding tools that tend to be burnt.

Among the few complete objects that come from Building 80 is a polishing tool 18940.x1 that comes from cluster (18940) that also included bone tools, mini clay balls and obsidian. This cluster was placed around the SW post F.3431 and according to the excavator it represents a 'left deposit' that was placed there after the building was partly destroyed by fire (Regan 2010: 17, Archive Report). The marble (or recrystallized limestone) polisher (dimensions: 100.60x75.00x23.09mm) is ovate in shape and has two opposed use-faces, one of which shows evidence for burning. Part of this use-face is missing, potentially an intentional removal as suggested by the presence of percussive wear on the margin next to the use face. The tool had clearly been used prior its deposition, but it is not a worn out tool that had reached the end of its use-life.

The majority of deposits, that have been interpreted as material brought from elsewhere and used for backfilling Building 80 (Regan 2010, Archive Report), contain mainly small-sized natural pebbles and andesite debitage (tertiary flakes and shatter) [e.g., deposits (18538), (18543), (18544), (18564), (18578)]. Deposit (18578) unearthed within Space 135 is the most artefact-rich (in ground stone terms) and stands out in relation to the rest of the backfilling deposits. Apart from natural pebbles, it contained one pink andesite flake, one fragment of a fire-cracked cobble, one shatter of greenstone, possibly serpentinite, that has one polished surface and most likely comes from the rejuvenation/reworking of a polished axe, one fragment of a marble bracelet/ring 18578.k3, one complete andesite grinder 18578.k1 (one-hand mano) and one orthoquartzite abrader 18578.k2 with two opposed flat use-faces. The grinder exhibits heavy wear on its use-face, part of which has been removed, perhaps during an attempt to rejuvenate the use-face, while the abrader that survives incomplete, has been heavily used and had undergone different episodes of use prior to its discard (judging from the way the use wear develop near the broken margins of the tool it is clear that the tool continued to be used even after it broke).

The largest concentration of ground stone material comes from deposit (18941) which also contained two obsidian points and a horn core. This concentration consists mainly of andesite grinding tools 18941.x6, 18941.k1, 18941.k4, one small-sized limestone polisher 18941.k2, a fragment of andesite, possibly originally from a grinding tool, two fire-cracked rocks along with a few fragments of unworked material. With the exception of the small-sized polisher 18941.k2 that survives complete, the remaining objects survive in a very fragmentary state. The state of preservation of the ground stone material from (18941), however, is not different to that encountered on material from other deposits. All tools from (18941) show evidence of use prior to their deposition/discard, but none are worn out tools and in the case of the grinding tool 18941.x6 the broken edges of the fragment are still sharp and not rounded suggesting that the fragment was deposited not long after it was broken. Deposit (18941) is part of the lower backfilling sequence of B.80 and according to the excavator these objects might have been intentionally incorporated within the backfilled material (Regan 2010: 19-20, Archive Report). Further comparative analysis of finds and contexts will shed light on the possible intentional character of this deposition of objects.

During the 2012 field season a cluster of artefacts (19818) was unearthed between the west wall of Building 80 (F.5036) and the east wall of Building 76 (F. 3401) (studied as a priority unit). The cluster contained animal bones, charcoal, obsidian and ground stone artefacts. The latter consisted of a) fragments of different types of andesite. These most likely belong to grinding slabs, but none of these retain part of the original use-faces of the tools. The fragments were worn, indicating that they were in circulation for a long period prior to deposition, b) two fire-cracked cobbles, c) an irregular-shaped limestone cobble, and d) two polishers: a medium-sized one with flat use-faces, that most likely was used for smoothing/polishing plaster surfaces on walls and floors (cf. Wright forthcoming), and a smaller-sized one. Both polishers survive in good condition and although they had been used prior to their deposition, they are not worn-out/exhausted tools.

One of the interesting issues that comes out from this preliminary analysis of the ground stone material is the variation encountered in the state of preservation of different objects and the different practices encountered with regards their deposition and discard. The condition of some of the tools deposited in B.80 suggests that these were discarded when still in usable condition and were by no means exhausted. This raises the possibility that this act of discard represents a deliberate choice to take out of circulation a set of tools that had been previously associated with particular events and thus were no longer deemed appropriate to be used in other activities. Variations in the deposition of ground stone objects raise questions about when it was appropriate for different objects to be discarded and in what condition (e.g., complete, broken, burnt etc). This issue will be explored in a systematic manner across different chronological and spatial contexts in the 2013 field season.

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15. Finds Lab 2012 Archive Report

Lisa Guerre, URS Corporation

Archaeological projects, like museums, must guarantee proper management, preservation and use of collections and facilitate research through a clear knowledge of project holdings. The Catalhöyük Research Project currently houses approximately 131 m^3 of artifactual material with a growth rate of approximately 7 m^3 per year. To ensure access to the abundance of material, and to support the various research initiatives of over 120 specialists with over 35 distinct specialisms, rigorous collections management is key. Project Finds Officers, in collaboration with a diverse project staff, have developed a system which focuses on physical accessibility and emphasizes the timely and accurate tracking of all project materials.

The Catalhöyük Project Finds Lab serves as a nodal point in the processing of artifacts and their distribution to relevant onsite specialist, maintains the artifact stores, and manages the digital inventory. This season saw a number of changes in the Finds Lab most notably the drafting of a new Finds Policy, the addition of two new staff members, and the construction of a third artifact depot.

The Finds Policy

In an effort to tighten tracking mechanisms and stress the accountability of all project staff a new Finds Policy emphasizing access to artifacts and the accurate recording of crate inventories was developed and implemented. The new policy includes tightened control over the artifact storage depots and holds all staff accountable for the recording of any artifact inventory changes they may make during their research. Direct access to the artifact depots has been limited to only the Finds Lab staff; all other labs no longer hold keys to the storage depots and Finds Lab staff are the only people to move materials from storage unless otherwise approved. Additionally, all labs are required to update any physical changes to artifact crate inventories they may have made within the Finds Central Database.

With the assistance of the Database Administrator, labs have been provided discrete logins to the Finds Central Database and were granted limited administrative rights. Permissions include the ability to directly input new crate inventories into the Location Register and the capacity to update preexisting inventories; labs are restricted to working only within crates housing material relevant to their research (i.e.: the Faunal Team can only manipulate the inventory of the Faunal crates). The individual lab specific login allows the Finds Officer to monitor usage of the Finds Central Database by project staff and track changes to crate inventories within the Location Register. The Faunal, Groundstone, Chipped Stone, Figurine, and Heavy Residue teams are actively using this feature in agreement with the new Finds Policy. The Finds Officer is continuing to work with the Database Administrator to implement further improved tracking functions and the addition of inventory controls within all lab/specialist specific level one database interfaces.

A long history of specialist shifting materials between crates has resulted in an inaccurate inventory and has made the job of the Finds Officer difficult when locating materials. It is hoped that, with the present functionality of the location register, the future integration of specialist databases, and the overall cooperation of all Lab Heads in utilizing the Finds Central Database, an accurate inventory of all finds on site will be maintained.

Finds Curator and Finds Assistant

To help enforce the new Finds Policy, the Finds Lab introduced two new members to its team, the Finds Assistant and the Finds Curator. The Finds Assistant, Alana Colbert, worked with the Finds Officer on various initiatives, supervised the washing and sorting of newly excavated materials and served as the Project Registrar. The Finds Curator position was introduced to track and control the movement of artifacts in and out of the depots.

As a trained archivist, Jennie Borgstrom, the Finds Curator, worked directly with the various labs in locating and checking in/out project materials. In addition, the Curator continued the systematic and comprehensive inventory of the artifact storage depots which was begun in 2005. The frequent movement of finds over the years, particularly in those years before the Finds Central Database was used regularly and its importance understood, has resulted in an incomplete inventory; since 2005 much energy has been spent re-inventorying project material and the Location Register updated. In the 2012 season the Finds Curator was able to complete a full inventory of the pottery crates (over 400 in all).

In an effort to continue to update and correct inventories while adding another level of accountability, the Finds Curator imposed a stringent system of crate inventory audits. Crates were fully inventoried upon being check out and inventoried again upon return. This ensured the material was placed back in its original location or, if moved, the inventory within the Location Register updated by lab staff in accordance with the Finds Policy.

Additional Updates

The 2012 season also saw the construction of a third artifact storage depot. This allowed material previously stored within the various labs to be organized and moved into this permanent storage facility. The shifting of this material presented the Finds Lab staff with the ideal opportunity to proceed further with the comprehensive artifact inventory program. With the assistance of the entire project staff a complete inventory of the Groundstone crates was carried out. In three hours approximately 100 people successfully generated an up-to-date paper inventory for over 370 crates; the inventory will be entered in the Location Register over the winter. This effort will help facilitate the location of Groundstone for future research beginning in 2013. Chipped stone and Building Material were also moved into the new depot with full inventories planned for future seasons.

Overall the 2012 season of The Catalhöyük Research project proved to be very productive and positive. The Finds Lab Staff is continually striving to improve its systems to efficiently and accurately contribute to the building of diverse datasets. The new Finds Policy, along with developments in both the physical and digital maintenance of the collection, has increased emphasis on accessibility and sustainability. Project Finds Staff have begun to develop a collections management system which focuses on physical access to project materials, stresses the timely and accurate tracking of inventory changes, and applies accountability to all project members. The addition of additional Finds Lab personnel has freed up time for the Finds Officer to make huge strides in data cleaning and work with Database Administrators to improve and add new functionality to the Finds Central Database and work towards maintaining an accurate and up-to-date artifact inventory.

16. Heavy Residue Archive Report 2012

Milena Vasić

This year 425 samples were fully processed (259 from season 2011 and 166 from 2012), while the rest of the samples from 2012 were sieved and stored for 2013. Some changes have been made regarding the collection and the processing of material from the heavy fraction.

HR processing

As mentioned in the previous report (Heavy Residue Archive Report 2011), only 60 samples from 2011 had been processed that year, hence the majority of the 2012 season was dedicated to the processing of the backlog from 2011.

The HR processing started on the 4th of July and lasted until the 20th of August. 5 sorters (Ebru Sivas, Fadimana Sivas, Saliha Sivas, Hatice Yaşlı, Şenay Yaşlı) were sorting the samples, whilst Ebru Sivas was also in charge of writing labels for the sorted material and sieving the smaller samples that were being processed 100%. After August 5th, Talu Emre Tüntaş supervised the HR process.

Processing of the backlog from 2011, which comprised of 259 samples from both the East and West Mound, was completed first. The samples were sieved and sorted; collected materials weighed, recorded and handed in to the Finds Officer for further distribution. Due to the "duplication" of the samples during flotation (samples comprising several bags were processed separately and hence multiple flotation numbers were assigned), the processing of the backlog took time. Instead of processing one sample as a whole, and therefore sieving, sorting, labelling, weighing and recording it only once, the work was tripled. Merging these samples and working on the rest of the backlog took almost four weeks. The same thing happened this year. As excavation of the multiple burial in the North Area took more than a couple of days, samples were being sent for flotation without first completing the unit. Additionally, each bag of soil from the same unit was not only given a different flot number, but also a different sample number which created disorder. Unless they are completely different samples, each flotation sample should have only one flotation number and one sample number.

Once the backlog was dealt with, we started with processing the 2012 samples. In total 157 (actually 166 flot numbers but 9 were duplicates) out of 521 samples taken in 2012 were fully processed, while the remaining 355 samples were all sieved and stored for next year. However, as the samples are already sieved, the sorting team can have an early start next year thus enabling the completion of the backlog within the first two weeks of the 2013 season.

Apart from 11 priority samples that were as per usual processed as soon as possible, the samples were processed chronologically. The processed samples from the North Area are mostly from the burial fills, while the majority of the samples that were taken this year from the South Shelter are construction/make-up deposits and infills of buildings 76, 80, 96 and 97. Excluding several priority units from the TPC Area, the rest of the TPC samples were stored to be dealt with in the future. As for the samples from the West Mound; this year, Talu Emre Tüntaş was in charge of processing them.

Heavy Residue Changes

Some changes have been made regarding the collection and recording of the material from the heavy fraction as well as the heavy residue processing in general.

As mentioned in the previous report, from 2011 onwards, all the material collected from heavy residue goes first to the finds officer for recording and then is further distributed among the labs. This way, the Finds Database will contain every single record from the Heavy Residue. Additionally, as automatic pulling of the data from HR Database was enabled, the Finds officer does not have to enter every record manually. To facilitate this automatic data extraction, some changes have been made. Namely, it has been decided to use the “date of sorting” field for separating the material. Material collected from the samples of 2011 was labelled as sorted on 01/07/2012 in order to be able to track the newly added material and automatically add it to the finds. Samples are still being separated by area, but from now on, each crate will contain all the material from one area. Once the backlog was done, all the samples from 2012 were being recorded as sorted on 15/08/2012 while the priority units have been marked as sorted on 01/08/2012. In addition to this, in order to facilitate faster location of the specific samples and to enable the specialists to query faster, each bag with material will also have a sorting date label as well. Once again, this date represents simply a code for the specialists to find the material they are looking for, and it will be especially useful for specialists dealing with smaller materials (for example, microfauna, shell or eggshell). As many small bags fit in one big bag, let alone a crate, finding material from a particular unit is a time consuming job.

As discussed in the previous reports, when it comes to the density analysis, counts for some artefacts are more valuable than their weight. The artefacts in question are beads, bone tools and objects made of clay. Unfortunately, this year it was not possible to enable these changes completely by altering the database. As the database still does not contain an appropriate field, counts were recorded in the “comments” field. Hopefully changes in the database will be made ready for next year.

Apart from the counting of beads, it has also been decided to record their material. For now, it is being recorded in the “comments” field, but after a discussion with the IT support, it will be decided whether new categories (clay bead, stone bead, shell bead, botanical bead, and copper bead) should be introduced, or whether this information should remain in the “comments” field.

Furthermore, after several meetings, it has been decided to change the categories of the artefacts made of clay. From now on clay objects from Heavy Residue will be divided into:

Clay Ball- spherical objects including mini balls

Clay Figurine- diagnostic fragments of the figurines

Clay Bead- beads made of clay with a clear perforation will be recorded under the Bead category

Clay Object- every other object made of clay but for pottery and building material will be recorded under this category

Shaped Clay- non diagnostic pieces of objects and natural material.

Due to an inconsistent categorization of the objects made of clay on site and frequent changes to the Heavy Residue database, already collected material will need to be looked at next year and sorted out by correcting the data entries and putting the artefacts into the right categories according to the new typology. As this is an enormous job that will require a lot of time, only artefacts from 2009 onwards will be checked, so the data is correct and ready for analysis in the next study season. At the same time, this will be a good opportunity to count these artefacts and record their quantities in the database.

After discussions with the head of the Ground Stone team, Christina Tsoraki, following the changes in the stone collection strategy from dry sieving, it has been decided to keep the categories “stone” and “worked stone”. However, special attention should be given to the sorting of stone, and the category “stone” should contain only natural rocks and pebbles. All of the angular pieces that are possible flakes should be recorded as “worked stone”. Additionally, apart from the obviously worked stone, raw materials that look different, larger pieces of chert and possible bead blanks should also be separated from the rest of the stone. Although some of these pieces are not worked stone, it will enable the Ground Stone team easier access to all the material of interest, and at the same time, a proper quantification of worked stone from the heavy residue in the next study season.

17. Conservation

Ashley Linge

Site and artefact conservation was successfully carried out during the 2012 excavation season, in collaboration with the conservation students from the Institute of Archaeology-UCL and the excavation/laboratory teams. The main activities of the season were the conservation and the maintenance of the buildings in the North and South Areas, the uncovering and conservation of wall paintings, the lifting and treatment of human and faunal remains, the conservation of pottery, as well as other small finds.

Research continued into particular on-site conservation problems, along with evaluations of experiments carried out the previous seasons. Consulting conservator Chris Cleere came to site to discuss future of the buildings on display and other environmental issues in conjunction with UNESCO World Heritage guidelines. Representatives from Middle Eastern Technical University (METU) visited site to establish a first responder program in the off-season, as well as environmental monitoring.

The Conservation and the Maintenance of the display buildings in the North Shelter and New Strategy for the Experimental Capping project:

In the 2012 season, the maintenance work of North Shelter continued as the unstable environment under the shelter (see 2009 Archive report) contributed to further deterioration throughout the structures. The conservation work undertaken involved the use of lime-based mortars with an adhesive to stabilise cracks and voids in walls and features as carried out in previous season (see 2006 Archive Report). The consolidation of plastered walls and other features was done with 10 or 25% Primal AC-33 (acrylic dispersion) in pure water depending on the strength needed. Where necessary for aesthetic purposes, fills were in painted using acrylic paints to blend the fills.

The excavation this season in further areas of the shelter, required the conservation team to support with numerous delicate block lifts. The lifts included a number of faunal remains as in previous seasons, but also included several glass vessels, copper and iron objects, human skulls, and an infant burial in a basket.

As the difficulties with the conservation and control of the environmental levels in the North Shelter continued (see 2010 Archive Report) the experimental capping project was carried out for another season in Building 5, however, a new approach was taken in collaboration with Chris Cleere's recommendations. In the two previous seasons locally available earthen plaster (marl) was used to cap the north wall F.228, wall F.229/Bench F.350, south wall F.224/Niche F.245 (See 2010 and 2011 Archive Reports). Using the marl has proven unsuccessful because it needs to be maintained in the off-season. This year the same features were used for testing a new strategy of lime wash and mud capping. The designated surfaces (i.e. north wall F.223, bench F.350, and south wall F. 246) were first coated in a lime wash 70% water to 30% lime. This was done to both create a sacrificial surface, but also to distinguish original mudbrick from a newly applied mud surface, which was the second phase of the recapping. A mixture of 60% sieved spoil, 25% water and 15% sieved straw was used to the lime surfaces once they had dried. The mud was continually monitored to check for cracks as the drying occurred, they were sprayed with water

and left to dry under geo-textile. The following day some fine cracks had developed over night so a second coat of finely sieved mud was spread across the surface of the mud (Figure 17.1).

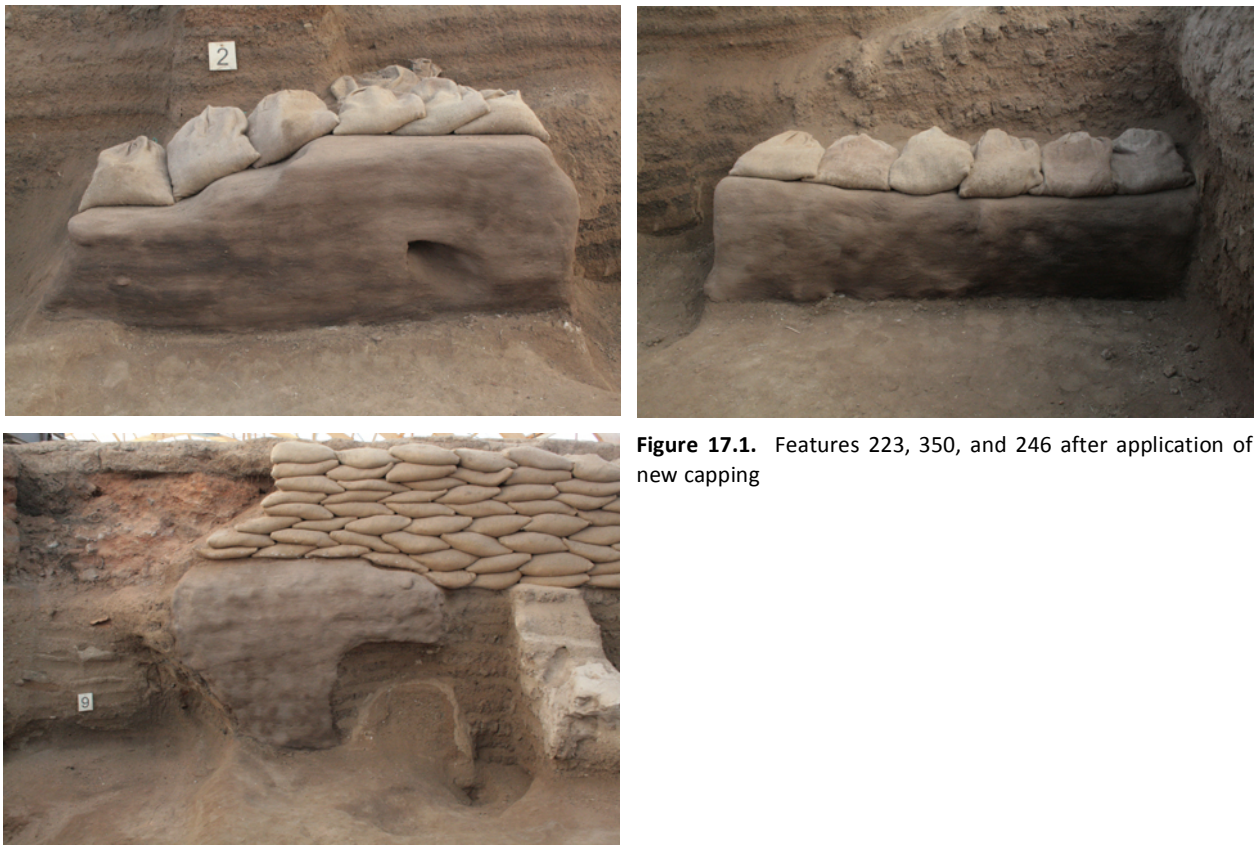

Figure 17.1. Features 223, 350, and 246 after application of new capping

This year the conservation team carried out another experiment in Building 5, with mudbricks. On the West wall (F. 227), on the north side of (F. 231), the east-west running wall, there has been a significant amount of collapse due to water run-off over the past few years. 4 mudbricks were made earlier in the season and installed in a stepped form where the water had done the most damage. The bricks were secured with a mud mortar mixture of 40% sieved spoil, 30% water, 30% sieved straw. The success of the bricks will be accessed in the next season, with the thought of replacing the sandbags in the building with new mud bricks.

In Building 77 the conservation team participated in the excavation this year, in addition to general maintenance, the team worked to establish a plaster sequencing for the northeast corner of the building (above the platform F. 6052). This was done to hopefully connect the different decorations on both walls with each other and with the platform below. The platform proved more difficult to connect as, there had been several cuts and repairs interrupting the wall painting at the bottom. Once progress reached the southern end of the wall, the stratigraphy became more complicated. What appeared to be the same layer on the southern end would sometimes be above the upper wall layers and at other sections would appear to move underneath the upper layers. In order to further understand the sequence of decoration, the decision was made to explore a small section of red plaster that had been exposed on the upper right portion of the wall underneath Unit 19467. After removal of 3-10 layers of plaster, four sections of geometric painting were revealed that matched up with the earlier geometric design, Unit 19465 (Figure 17.2) (See 2012 Archive Report). This led to a re-examination of the relationship between the two sections of the wall and the history of construction. This project

was ultimately successful in connecting the two north and east walls together, as the east wall had a further 3 handprints (Figure 17.3).

Figure 17.3. *Continuation of geometric pattern*

Figure 17.3. Continuation of handprint motif in Building 77

The use of burlap sandbags was re-evaluated this season, as it was discovered that the bag were absorbing moisture from the surround mudbricks. This moisture absorption created microclimates that exacerbated deterioration in some areas, and in the instance of F.3094 caused part of the wall plaster to fall off when the wall was uncovered at the beginning of the season. To prevent this from happening further, areas with these bags were checked, and those most at risk had a barrier of geo-textile placed between the earthen structures and the bags, in the future the bags will be replaced with a more suitable material.

The Conservation and Maintenance of the buildings in the South Shelter

The conservation and maintenance work in the South shelter continued as the excavations progressed. Conservation work was carried out in Buildings 79, 80, 89, 97, 96, 43, and space 470.

Before conservation work began, that North wall of Building 80 needed to be taken down to a safe working height (F.2533). Once this was complete, the conservation team began peeling plaster layers looking for further wall paintings, as it is common to find paintings of the north wall above the platform especially given the elaborate geometric pattern on the east wall (F. 5014). The plaster was peeled back to approximately 1 cm before the mudbrick, this is due to the fact that the plaster helps to preserve the mudbrick and also the building has been designated as a long-term display building. Unfortunately only a small section of the north wall (in the western corner truncated by Mellarrt) had a badly degraded painting. It appears to be a continuation of the geometric pattern, but because it is so badly degraded it is difficult to be certain.

Further plaster peeling was done on the eastern wall, which yielded some interesting results. Rather then separate painting events; it appears that the repetitions in the painted pattern are original repairs. There are 5 distinct repair events, which coincide with the building up of the ridge at the top of the painting. Once the ridge was taken down, the top of the geometric pattern was visible in the centre section. The painting was taken mostly down to the first painted event, with exception where it appeared the painting was completely gone. The painting

was consolidated with 2.5% Paraloid B72 w/v in acetone/alcohol 50:50 using a spray bottle at the end of the season. The painted niche that runs around the room was peeled this season as well. Revealing different colours in different sections of the room, variations of red and orange, as seen in the geometric pattern (F.5014). In the central section of the east wall, there are what look like drip marks running down the wall from the bottom of the recessed area (Figure 17.4).

Figure 17.4. Feature 5014 at the end of the season

The children's handprints near the oven (F.5041) had survived fairly successfully over the winter, over the course of the season, new areas of paint appeared, but were left for follow up next season. The handprints were consolidated with 2.5% Paraloid B72 w/v in acetone/alcohol 50:50 using a spray bottle at the end of the season. The platform and walls were backfilled at the end of the season.

Building 79 has been marked as a long-term display building; due to the burned condition of the building this presents challenges for the conservation team. The first part of this process was to gently peel back the degraded plaster layers creating a cohesive surface for consolidation. The rest of the painted railing was exposed with a scalpel revealing a delicate red surface. The walls were consolidated with 25% Primal AC-33 (acrylic dispersion) in deionised water v/v by using a pipette and spray bottle. Cracks were mortared with 10% Primal AC-33 in water with the lime mortar mix. The floor was swept of fallen spoil and the sandbags readjusted. The walls were back filled at the end of the season with soft sacks and spoil sacks.

Conservation of small finds

Work was carried out on a variety of finds excavated in the field such as: horn cores, bucrania, and other animal bones, pottery, clay, glass iron, copper alloy, ivory, and human skulls. The team also retreated objects that needed further conservation from previous years. Completed objects such as pottery and complete or diagnostic animal bones were conserved for analysis. As the backlog had been completed the previous season, the conservation team began work with the Finds Officer to check delicate or deteriorating objects in the depots.

The two "handprint painting" on the north wall (U.19078) of Building 77 from the 2010 season, had their conservation work completed at the beginning of the season. Along with the three incised plaster wall sections (U. 15838) excavated in 2009 from the TP area. The handprints and one of the incised panels were selected to go to the Konya Museum, and were stabilized accordingly, schematics for display cases were also submitted with the panels.

Documentation of conservation

This year, the conservation team has begun a new monitoring program with both the GIS and 3D imaging teams on site. With the help of the GIS team, a decay map was created for the North and South shelters. Each map marks potentially problematic areas in sections of the site where excavations are no longer taking place. The shelters differ slightly in types of damage and in what was necessary to mark on the map. On the map of the North shelter areas with collapse, delamination, erosion, honeycombing, salts, under-cutting, and water damage were identified. In the South shelter, where there are large-scale steps cut in the earth as the site descends, points were taken around the steps just above exposed buildings to measure how much the steps are deteriorating given that they are for structural support down the mound. In addition to the stepping, water damage, honeycombing, insect damage, and structural cracks were marked. These maps will be repeated next year to assess the differences in the XYZ coordinates of the identified areas as well as to map any new areas. The 3D team created point cloud maps of each shelter, which is a low-resolution 3D scan. Once this is done again next year the images can be overlaid to identify changes in the landscape of the site.

Future Objectives

Having year-round environmental monitoring at the site is the next phase of the monitoring project. Being able to understand what happens in the shelters in the off-season will help the conservation team make more informed decisions about the treatment of the site. In addition, monitoring in the depots will help both the conservation and finds the teams to care for the archive. A well-designed monitoring system will help the conservation team identify those treatments that worked and those that did not. By being easy to carry out, replicate, and understand, the monitoring system from year to year will also help alleviate some of the continuity issues amongst the conservation team at Çatalhöyük. Hopefully, utilizing the two different types of decay maps, along with the environmental data will aid the conservation team in developing better long-term preservation methodologies for the site.

Acknowledgements

Big thanks to all team members who made 2012 a very successful season, especially the wonderful conservation students who rose to every challenge presented to them.

18. Digital Data Archiving Protocol

James Stuart Taylor (with contributions by Burcu Tung and Scott Haddow)

From the 2012 season onwards at Catalhoyuk, there are a number of digital formats which need to be archived as part of their logical workflow. Currently these include:

3D Modelling using Computer Vision software solutions.
3D Modelling using Laser Scanning technology.
Capture and 2D digitization using orthogonally rectified photographs.
Including field based digitization using tablets.
Primary field based digitization using a robotic Total Station.

Currently workflows and costings are being developed for all of these techniques, for integration into this document and subsequent evaluation. For now this document will attempt to outline the agreed archive formats, naming conventions and file structures for each of these digital data capture techniques, with a strong focus upon management of the 3D data-set, which requires careful treatment in order to integrate it into our existing data management systems.

3D Modelling

Model Type	Documentaton Level	Rationale
Artefact	Primary Documentation	Augmentation of finds documentation
Unit by Unit	Primary Documentation	Augmentation of primary archive
Feature by Feature	Secondary Documentation	Augmentation of field based synthesis & reflexive interpretation
Space or Building	Secondary Documentation	Augmentation of field based synthesis & reflexive interpretation
Area	Secondary Record of excavation process	Documentation of stie morphology, possibly augmentation of conservation records
Sketches (Incremental or Work in Progress, Daily, Weekly or End of Season)	Primary Record of excavation process	Historical tracking of excavation / Augmentation of reflexive interpretation
Conservation	Primary Documentation / Record of excavation process	Augmentation of conservation records

Table 18.1. Types of 3D Scan identified in the 2012 evaluation period,.

From the outset it was agreed that all 3D models should be stored within a library, organised by area and model type, in the form of data-packages (discreet folders relating to each model which follow a series of naming conventions and protocols to facilitate storage and access of the models). The overall file structure is outlined in Figure 18.1, and is meant to function within the Catalhoyuk's existing Extensis Portfolio photo management system, for ease of access in the off-season. A second advantage of this is that it forms a very simple and flexible archival file structure for the data-packages, making room for many applications of 3D digital data capture, whilst facilitating sophisticated attribution of metadata and tagging, allowing the material within the data-packages to be found quickly and efficiently by all users.

The following sections will outline the folder and file naming conventions for the data-packages, and detail the minimum required contents for each data-package and rationale for their inclusion.

3D Model Scale and Application

During this period of evaluation and experimentation we have identified 7 key areas in which 3D modelling is an appropriate level of documentation. These are outlined in Table 18.1. It is worth noting that although these types of models vary in scale, they are meant to be flexible in their application and the rationale for their implementation is fluid and may crossover, depending upon the requirements of the project.

File Structure for the Storage of 3D Data

All data relevant to an individual 3D model will be parcelled up as a data-package (see following section), this will form the primary level of file storage for each model. These will be nested hierarchically within a deliberately simple file structure that is based upon the various scales of scans (discussed above). These will then be grouped simply by area (see Figure 18.1 below). This file structure will act as the back end to a new 3D Model catalogue within the projects existing Extensis Portfolio system.

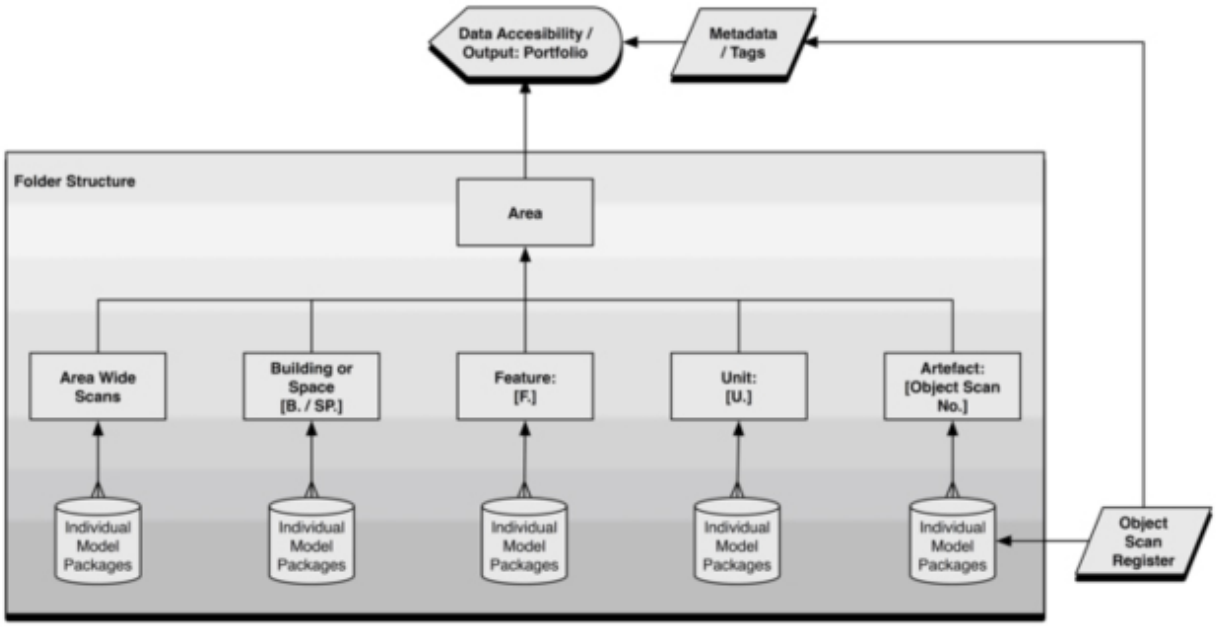

Figure 18.1. File Structure for storage of 3D Model data

Tagging & Metadata

The use of Extensis Portfolio as a data management system will allow for easy storage and accessibility online both on and off-season. Further more it will allow sophisticated querying of the necessarily simple underlying file structure through the addition of metadata and batch tagging of the files.

In particular Tags will focus upon the necessary documentary identifiers for the models, such as: Area, Building No., Space No., Feature No., Unit No., Object Scan No.

Furthermore drop down boxes will be added to categorise the scan type/rationale:
In Phase, Daily, Weekly or End of Season Sketch, Incremental or Work in Progress, Primary Level Documentation, etc.

These can be added to as the models are used with more variation.

There should also be metadata that distinguishes the type of data:
Phase Shift Laser Scan, Time of Flight Laser Scan, Triangulation Laser Scan, Computer Vision etc.

Basic Data-Packages by Method.

Computer Vision Data-Package
This will consist of one folder, named using the following convention:

[Prefix]UniqueNumber_Increment Number

Agreed prefixes are defined in Table 18.2 below and are based upon the scale of model generated, these are in line with the already defined archive file structure (see Figure 1).

Scan Scale	Prefix
Area Code	Area…
Building Number	B…
Space Number	SP…
Feature Number	F…
Unit Number	U…
Object Scan Number	SC…

Table 18.2: Folder and File Prefixes for 3D Model data

The prefix will be immediately be followed by the appropriate number, with no space, hyphen, or dots. All data-packages will include a three digit numerical suffix beginning at one and separated by an underscore, to allow for the management of incremental models of the same space, feature, unit, etc.

e.g.
B80_01
Or
SP470_01
Etc.

Each Computer Vision data-package will contain the following documents:

Item	File Type	Example File Name	Reason for Inclusion
Source Photos	.raw	B80_001_8088.raw	Archival copy
Source Photos	.jpg	B80_001_8088.jpg	Working copy (for generation of model)
Model Geometry	.psz	B80_001.psz	1st Stage Model Processing
Model Texture	.jpg	B80_001.jpg	1st Stage Model Processing
Model Header	.mtl	B80_001.mfl	1st Stage Model Processing
Exported Working Model	.obj	B80_001_H.obj15	High Resolution
Exported Working Model	.obj	B80_001_L.obj16	Low Resolution
Presentation Model	.pdf	B80_001.pdf	For easy consultation & distribution
GIS Combatable Surface	.3ds	B80_001.3ds	For integration into GIS
Screenshot	.png	B80_001.png	For portfolio thumbnail
Readme	.txt	B80_001.txt	Outline rationale behind model

Table 18.3: List of documentation for inclusion in the Computer Vision data-packages

All file names will follow the same protocol as the parent folder, with the addition of a number of suffixes for the sake of clarity (see footnotes above).

Phase Shift or Time of Flight Laser Scanner Data-Package

Although Laser Scanning devices generate point cloud (not meshes unlike the Computer Vision technique) their data-packages will be archived in the same basic file structure as the Computer Vision data-package outlined above, and similarly accessed through Extensis Portfolio catalogues. Table 18.4 details the required contents for the data-packages.

All file names will follow the same protocol as the parent folder, with the addition of a number of suffixes for the sake of clarity (see footnotes above).

[15] N.B. '_H' suffix representing high resolution model
[16] N.B. '_L' suffix representing low resolution model

Item	File Type	Example File Name	Reason for Inclusion
Point Cloud	.ply	B80_001.ply	Raw point cloud data
Photos for Texture	.raw	B80_001_8088.raw	Archival Copy
Photos for Texture	.jpg	B80_001_8088.jpg	Working copy (for generation of model)
XYZ for GIS	.txt	B80_001_xyz.txt17	For point cloud importation to GIS
Exported Working Model	.obj	B80_001.obj	Standard format for easy manipulation of 3D Model
Screenshot	.png	B80_001.png	For portfolio thumbnail
Readme	.txt	B80_001.txt	Outline rationale behind model

Table 18.4: List of documentation for inclusion in the Time of Flight Laser Scanning data-packages

Optical Object Scanning Data-Package

Laboratory based scanning of finds and artefacts utilises optical scanning technology, but the output can be archived once again using the same basic folder structure as Computer Vision and Time of Flight Laser Scanning.

The nature of find scanning means that it is impossible to track the scans using a unique object identifier (not all finds that are scanned have X or Specialist numbers attached for them – especially, although by no means exclusively, pottery and animal bone). To resolve this a new Object Scan Log (stored in an appropriate folder upon the /S: Drive) will be implemented (see Table 18.5 below), and all object scans will be allocated a new 'sc' number at the time of scanning. This will be used to guide the folder and file naming protocol in the same way as the other 3D data-packages. In this way artefact scans can be treated in the same ways as graphics and illustration. The project illustrator has agreed to track the allocation of these numbers.

The new register will contain (as a minimum) the following information:

Scan No	Date	Unit	X or Specialist No.	Description
sc00118				

Table 18.5: Example Object Scan Log

Note the addition of the 'sc' prefix to distinguish the scan number as the unique identifier.

The following table outlines the contents of the associated data-packages:

[17] N.B. '_xyz' suffix representing to distinguish from readme file
[18] N.B. 'sc' prefix denotes Scan Number

Item	File Type	Example File Name	Reason for Inclusion
Mesh	.ply	SC001_.ply	Raw point cloud data
Photos for Texture	.raw	SC001_8088.raw	Archival Copy
Photos for Texture	.jpg	SC001_8088.jpg	Working copy (for generation of model)
Exported Working Model	.obj	SC001_001.obj	Standard format for easy manipulation of 3D Model
Screenshot	.png	SC001_001.png	For portfolio thumbnail
Readme	.txt	SC001_001.txt	Outline rationale behind model

Table 18.6: List of documentation for inclusion in the Laboratory Based Object Scanning data-packages

All file names will follow the same protocol as the parent folder, with the addition of a number of suffixes for the sake of clarity (see footnotes above).

2D Orthogonal Photography

Alongside the 3D workflows, a number of other primary level digital recording techniques are being tested in the field that rely heavily upon the generation of rectified orthogonal photographs to generate the data.

Primarily 2D Orthogonal photography will be utilised in the digital recording of skeletons and in the tablet based on-site recording workflow.

All orthogonal photographs will be archived in portfolio in a similar way to normal site photographs. The file naming protocol will reflect the other digital methods, for example:

F2309_8007.raw & F2309_8007.jpg

Where the prefix represents Feature (followed by appropriate unique identifying number) underscore photographic number. As with all photos, .raw archival formats will be stored alongside compressed working copies in .jpg format.

Primary field-based digitization using a robotic Total Station

All plan field-based Total Station (TS) recording was done primarily in the North Area, to increase the speed of recording units. This method was not applied to all contexts, for example units showing multiple episodes of truncation. The primary data produced with the TS are data points stored within a simple file format tagged with the associated unit. During the 2012 season, after the end of each field day, the TS data points that relate to a particular unit were immediately imported into the Çatalhöyük GIS database where they were transformed into polygons, tagged with the unit number.

Once a unit was recorded in this manner, an individual plan was produced through the GIS database, printed and kept with the rest of the graphics produced within the area. These plans were allocated a graphics number, which is recorded within the unit sheet. The soft copies of

these plans were stored within the site server as .pdf files. The organization of the .pdf files have not been entirely agreed upon and deserve further attention in the 2013 season.

Further, an a rigorous methodology must be implemented in the usage of field-based TS planning in the upcoming seasons, in order to maintain the comprehensive and detailed recording necessary for the intricate archaeological record.

19. 3D Digging Project, UC Merced

3D-Digging is a research and educational project born from the collaboration between UC Merced and Stanford University in the Fall 2009. The main goal of the project is the three-dimensional documentation, reconstruction and representation of the process of archaeological excavation by the integrated use of different digital technologies such as: laser scanning, computer vision, photogrammetry, stereo projection and real time rendering/visualization.

Team Leader: Maurizio Forte
Research Assistants: Nicolo' Dell'Unto, Lund University, Nicola Lercari, UC Merced
Time of Flight/Phase Laser scanning Coordinator: Nicola Lercari
Computer vision Coordinator: Nicolo' Dell'Unto
Optical laser scanning: Althea Asaro, Chris Faria
Post-processing long range laser scanning: Nicola Lercari, Chris Faria
Post-processing computer vision: Elisa Biancifiori, Nicolo' dell'Unto, Francesca Pajno, Matteo Pilati.
3D Sketching: Elisa Biancifiori

Technologies
Hardware: Laser Scanner Focus Faro Technologies, Laser Scanner Nextengine, NVDIA 3D Vision Kit, 3D Camera Fujitsu, StereoProjector ViewSonic, Videocamera Jvc, Digital camera Canon 50D, 400D.
Software: Meshlab, Photoscan, Stereoscan, Meshmixer, 3D Studio Max, Scanstudio HD, Gimp, Autocad, Adobe Acrobat Pro, QGIS.

The 2012 digital system of data recording has followed in part the work done and established in 2010-2011 with relevant improvements. The main goal is the daily use of 3D image modeling, computer vision, 3D laser scanning and 2D photogrammetry for the production of a very standardized digital workflow for archaeological fieldwork. Laser scanning and computer vision for the creation of high-resolution 3D models of buildings, stratigraphic units and artifacts; 2D photogrammetry and orthophotos for digital drawing of plans, sections and maps. The daily use of a tablet pc during the excavation of the

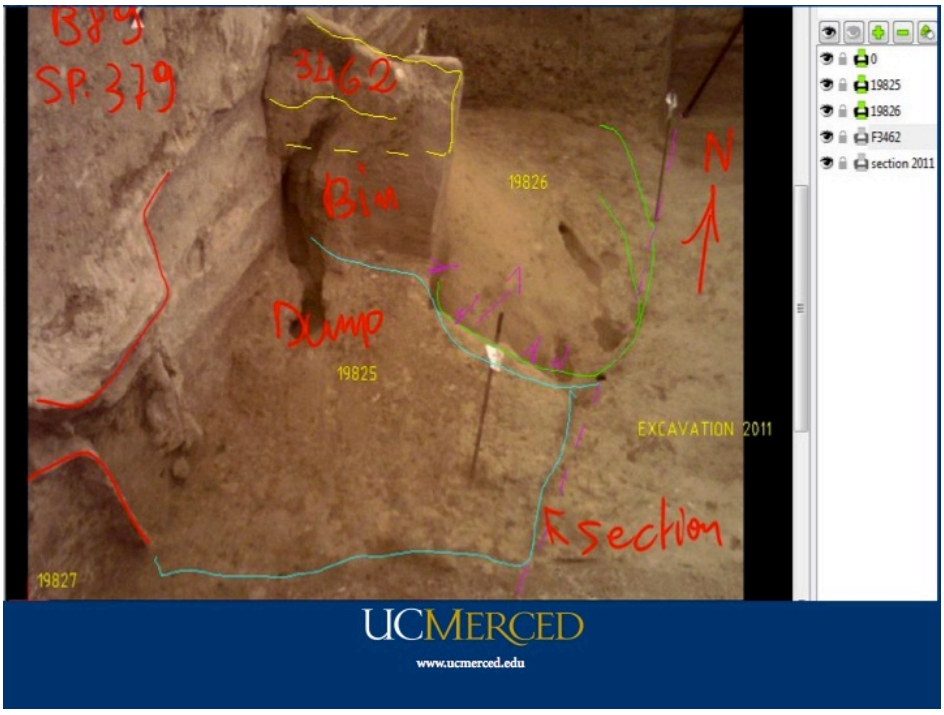

Figure 19.1. Digital sketch on tablet pc.

building 89 increased substantially the digital workflow of data recording on site: 2D photogrammetry, sketches and also computer vision (Figure 19.1).

Digital drawing, image modeling and sketching on site allows a better understanding of the excavation process and direct data recording of any archaeological evidence. In fact for stratigraphies the indirect recording process can create misinterpretation in the digital processing of raster data without an *in situ* validation. For example the digital drawing of a stratigraphic unit after image rectification is more affordable and precise on site than in lab. An usual issue, in fact, is the recognition of units boundaries just by color on raster images, without a direct analysis on texture and components.

The digital workflow tested in the 2012 season is very robust and totally compatible with the pre-existing digital system used at Catalhoyuk (database, GIS, data recording, metadata, multimedia). The final goal is the integration of all the archaeological data in the same 3D geospace at different levels: 3D visualization software (Meshlab, Photoscan, 3D Studio Max, GIS) and more standardized 2D-3D software such as ArcGIS, QGIS, OpenJump, Autocad, Meshmixer. All the 3D models are georeferenced and exportable in different spatial software and platforms.

The current workflow allows every team to manage independently almost all the phases of digital data recording on site and to interpret the data directly on site or in the lab at the end of the day: by computer vision, 3D sketching, 3D visualization. The systematic and standardized used of table PCs on site and for every trench could allow substituting integrally traditional manual drawing with the digital one.

Computer vision (shape from modeling) is undoubtedly the most effective, user friendly and robust technique in intra-site contexts. The fact that involves the use of standard digital cameras (from 8 to 18 Mpixels) and very low cost and open source software (Photoscan and Meshlab), makes all the pipeline very portable and usable from different teams; de facto using the same technologies. At Catalhoyuk computer vision is typically used at intra-site level for data recoding of buildings, layers, units, features and burials.

Laser scanning is a technology able to work almost in any environmental context (night, day, sunlight) and in large-scale sites and landscapes. At Catalhoyuk is used for data recording of macro-areas of excavations (North, South shelters, West Mound) and during the excavation of the building 89 (by unit and phase).

In addition optical scanners (Nextengine) are used for 3D recording of artifacts and x-finds. Optical scanners work correctly with several kinds of objects but not with shining material (for example obsidian). From 2012 this data recording has to follow the general guidelines for all the 3D models produced during the fieldwork season.

3D Data Recording

2012 fieldwork season have involved different scales of data recording: artifacts by optical scanner (microns accuracy); stratigraphic units by computer vision (accuracy: 0.5-1 cm); buildings and features by time of phase laser scanning (accuracy: 3-5 mm); large scale models (South and North shelters) by time of phase laser scanners (0.5 cm). Table 19.1 summarizes the statistics of 3D data recording in 2012.

Computer vision	Laser Scanning Long Range	2D Maps	Optical scanner
B89 25 phases	B89 25 phases	B89_17-19	10 artifacts
B80 3 models	South Shelter	B76 wall	
B96	North Shelter	21 burials	
B91	1 phase		
B97	1 phase		
SP470	1 phase		
B77 5 phases	5 phases		
Burials	21 (different phases)		

Table 19.1. The Statistics of 3D recording in 2012

The systematic use of computer vision and 2D photogrammetry for data recording of burials was extremely successful for the osteologists' team coordinated by Scott Haddow. In fact in 2012 it was possible to record and reconstruct in 3D 21 burials with related 2D drawing of skeletons and other features. In this case the digital workflow involves computer vision for the generation of 3D models, 2D and 3D georectification, 2D drawing of the burials in CAD (Librecad) and finally their implementation in ArcGIS as digital maps (raster-vector) and 3D models (3ds).

For the building 89 3D data recording has followed the procedure of single context excavation: every 3D model was generated in relation to the identification and classification of stratigraphic units (as the manual drawings). Therefore, for every phase of excavation by unit a 3D model was generated by laser scanning and computer vision. All the models of B89 are aligned and georeferenced (total 25 phases in 2011-2012) and it is possible to reconstruct in 3D the entire sequence of excavation (fig.2).

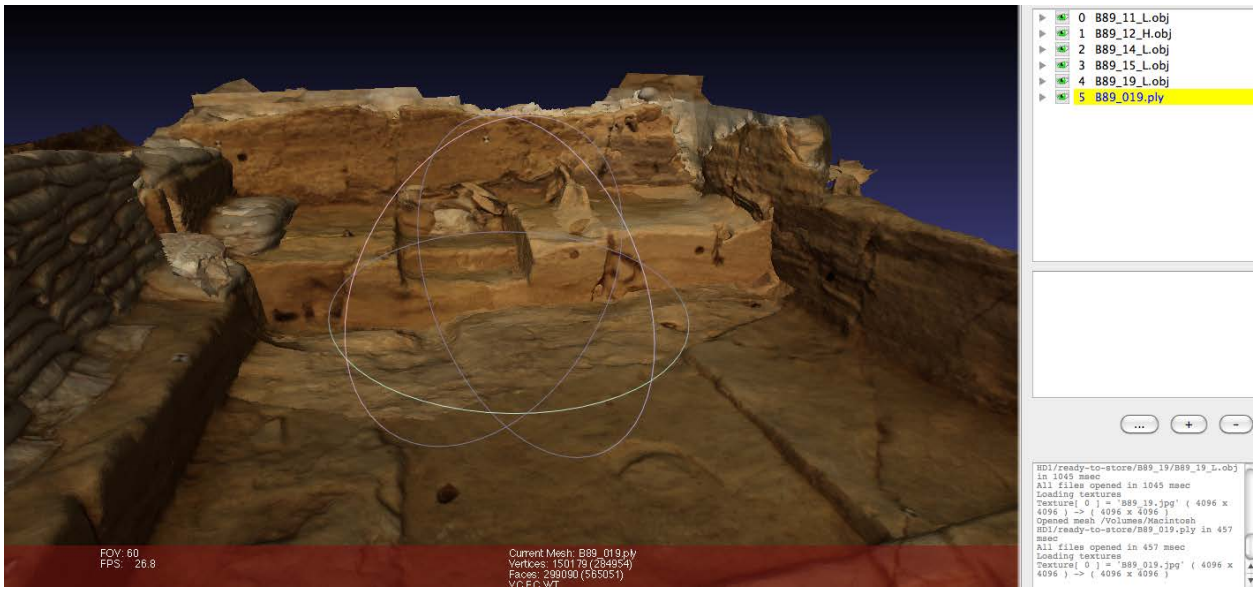

Figure 19.2. 3D reconstruction of B89 during the first phase of excavation (image modeling with Photoscan Pro)

2D Maps and plans

Hardware: digital camera Canon EOS 60D 10-22 mm, tablet PC Motion Computing (Windows 7, 2gb Ram), wireless sim card, monopod, Total Station VX Trimble Spatial Station.
Software: Perspective Rectifier, Librecad, OpenJump, ArcGIS

A first experimental phase of digital drawing started in the building 89 with the integration of a tablet PC, a digital camera equipped with a wireless sim card and a related software of raster rectification and CAD drawing (Figure 19.3). The goal is to implement a digital georeferenced drawing during the excavation work on site. This is the digital workflow:

1. Once identified the target area (usually a unit or feature) one has to shoot with the camera installed on the monopod so that to reach an almost perpendicular position to the ground.
2. While the operator start to shoot, the tablet PC download almost in real time the digital pictures via wireless card.
3. The picture/s are imported in the software Perspective Rectifier and georeferenced with 4 control points according to the excavation grid.
4. The software generates a tiff or png picture linked with a dxf file
5. The dxf file then is exported to Librecad for the final drawing and tracing
6. The final output will be a raster and vector overlay georeferenced in ArcGIS or other GISs

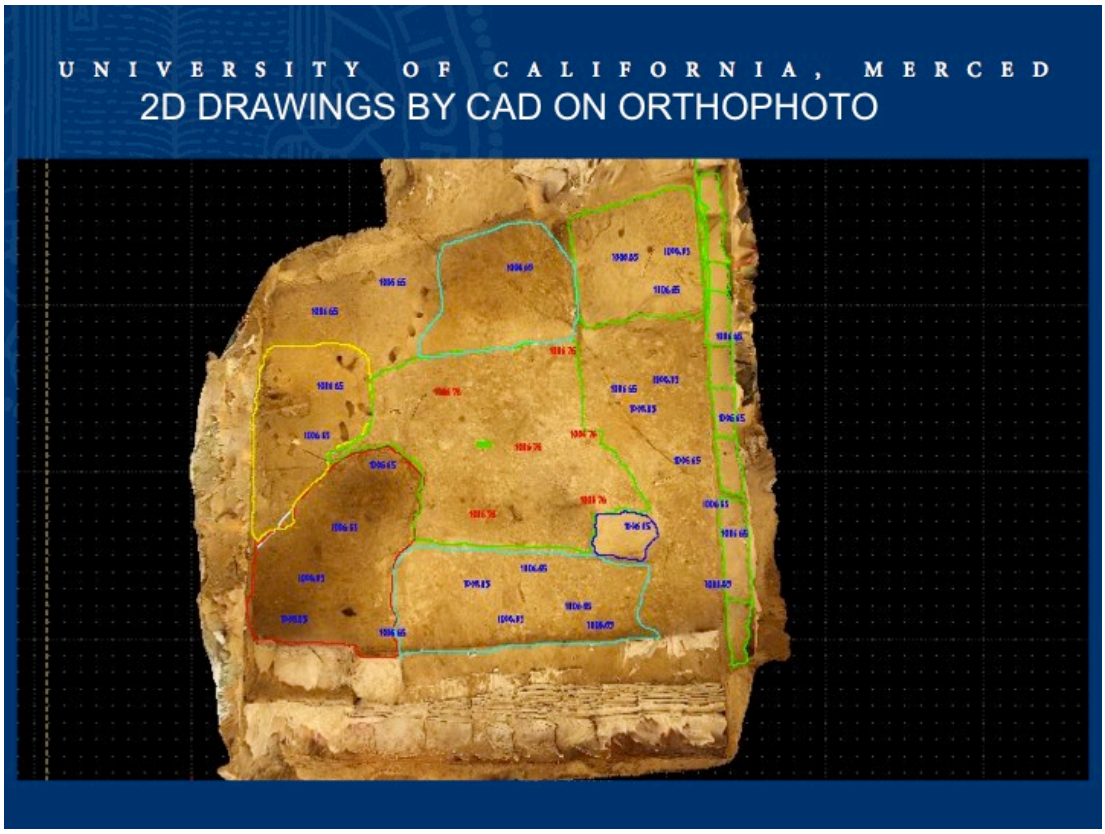

Figure 19.3. Ortophoto rectified by Perspective Rectifier and digital drawing in overlay made with Librecad

Alternative options
In the case of large size structures, such as a house or a wide unit, an effective alternative could be the generation of orthophoto by Photoscan or Photoscan Pro or by Perspective Rectifier. The following step is to import the orthophoto in Librecad and to start the drawing by units and layers.

- The orthophoto generated by Photoscan Pro can be georeferenced by markers and control points using local or geographic coordinates.

Tablet PC

The use of a tablet PC (Motion Computing) at Catalhoyuk in the season 2012 was very successful. The computer hosts the following software: Perspective Rectifier, Librecad, Photoscan, Adobe Acrobat. The tablet is able to download in real time the pictures from the camera and to export them in Perspective Rectifier and Librecad for the rectification, georeferencing and drawing. In addition the tablet has its own internal camera for taking snapshot during the excavation: in that way it is possible to make comments overlay and drawing in Librecad and 3D sketching with Adobe Acrobat Pro. In the current season the tablet was used for 2D sketching (the tablet has also an internal camera), photo rectification and georeferencing, orthophotos and digital drawing of layers, features and units (Figure 19.3).

3D Laser scanning

Hardware: Faro Focus 3D Time of phase (**0.6m - 120m indoor or outdoor with low ambient light and normal incidence to a 90% reflective surface)**, Canon EOS 60D 10-22 mm, 18mm.

Software: Scene, Meshlab, Meshmixer.

The use of long mid-range laser scanners, such as the Faro Focus 3D, is aimed usually at data recording of large scale structures, such as settlements, buildings or portions of landscape.

In the 2012 season all the North and South shelters have been digitally recorded with an average of 35/40 scans each and produced around 350 million of point clouds. In addition the B89 was entirely recorded by laser scanning and as well by computer vision during the excavation. This experiment is quite remarkable in archaeology since it is able to generate simultaneously 3D models of the same layers, unit and stratigraphy using two different technologies: image modeling by digital photos and 3D laser scanning. Models made by laser scanners are usually more accurate, but they require a long phase of post-processing for transforming the clouds in meshes. In the season 2013 thanks to a new time of shift phase scanner, it was possible to record about 300,000 points per second: with a so high density of point clouds it is possible to work in real time with the models since they look as meshes and not points. More specifically 47 stratigraphic units have been recorded in 2012 in the building 89 by laser scanning and computer vision.

The great precision and accuracy of the scaled and georefenced clouds makes this procedure particularly useful for pre excavation and post excavation surveys of the entire areas of excavation (Figure 19.4).

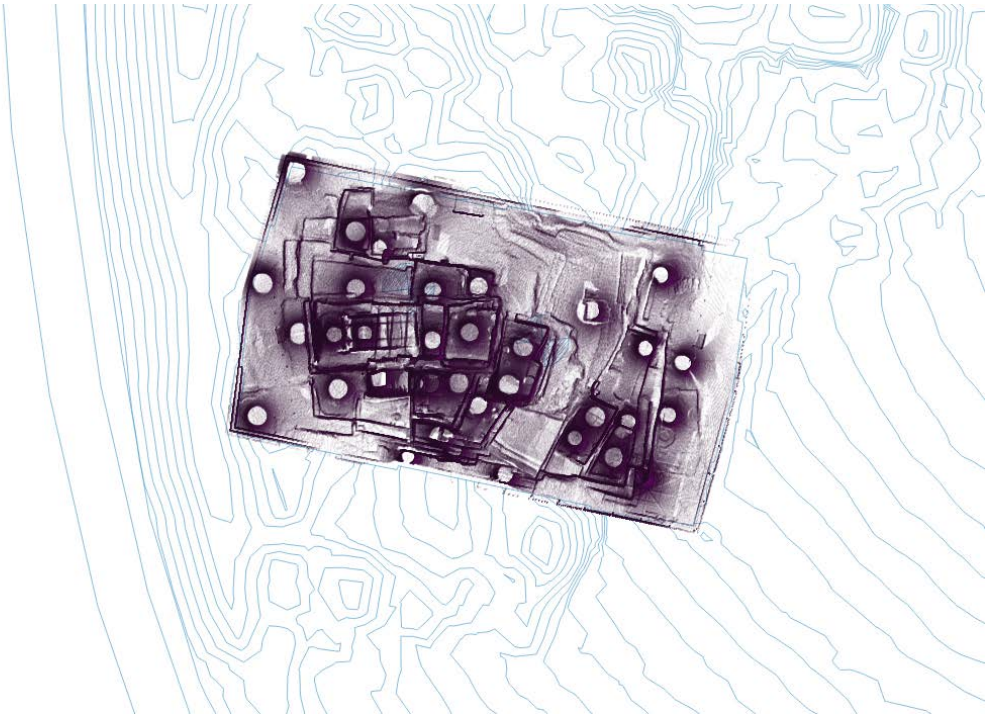

Figure 19.4. South shelter: 3D plan recorded by laser scanning and integrated in a 2D GIS (QGIS)

Computer vision

Hardware: Camera Canon EOS 60D, 10-22 mm; Camera Canon EOS 550D, lens Sigma 15mm
Software: Photoscan, Meshlab, 3D Studio Max, ArcGis

Work description

During the season 2011 we tested different methods of 3D data capturing for the documentation of the ongoing excavation of the building 89. Goal of this experiment was studying the most efficient workflow for the 3D data recording of the excavation in terms of accuracy, acquisition and time processing.

The results of this sub-project clearly demonstrated the very successful use of Computer vision techniques combined with Total Station in generating geo referenced 3D models during the ongoing field investigation.

During the season 2012, we decided to test this method more extensively acquiring different buildings and spaces at different stages of their investigation process.
- As first step, we created a grid of 3D points using the total station in order to geo-reference the 3D models with the projection system currently in use in the project.
- With the help and the support of the different excavation teams, we started acquiring processing and geo-referencing the structures in different areas of the excavation (in some cases the structures have been acquired and processed directly from the field archaeologists).
- Once acquired a sufficient number of structures, we started developing a workflow of data optimization in order to import the 3D models into the GIS excavation system.

GIS implementation
All the 3D data recorded in computer vision and by laser scanning once georeferenced can be exported and integrated in GISs such as ArcGIS or QGIS (Figure 19.4).

3D Sketching

In 2012 campaign an experiment of daily sketching was introduced for some excavation trenches (B89, 97). The scope was to have a sort of 3D visual daily diary of the excavation based not just on the identified units and layers but also on potential interpretations, comments, ideas, and so on. The characterization of 3D sketching started on site and continued then in lab after the generation of 3D models made in computer vision. In short, the digital workflow was the following:

data capturing by image modeling and creation of 3D models of B89 at the end of the day;
exporting of the models in pdf in Acrobat Pro;
3D sketching in overlay with annotations, comments, audio comments and outlines.

Once created, the 3D pdf models are completely interactive (Figure 19.5), editable and visible in any computer with a pdf reader. A so portable format opens new perspectives for 3D data sharing and collaboration and offers an intermediate solution in between data capturing and final interpretation.

Figure 19.5. 3D sketches in pdf format

Infrared Digital Camera

Infrared cameras are typically used for identifying presence of water changes, moisture and humidity, thermal conductivity and thermal mass of building material. The presence of water/humidity changes the thermal conductivity and the thermal mass of the building material. It may also changes the surface temperature.

Given this premise, it is evident that the use of digital infrared cameras at Catalhoyuk is interesting in relation to the analysis of wall paintings, plaster and mud bricks. In fact materials with different composition reflect the light in a different way and have different levels of absorption of humidity.

The experiment has concerned the East wall of the B80 and a sampling of stratigraphic units of B89 (19830, 19829). In Figure 19.6 the infrared visualization concerns the wall painting of the B80: the red areas are the hottest, the blue ones the coldest. Even it is a very preliminary test it seems that the paintings and micro-layers of plaster are better preserved in the coldest areas or whereas humidity is more concentrated.

Figure 19.6. Infrared visualization of the wall paintings in B80

DEM

In the Northern area of the East mound, a high resolution DEM was created by laser scanning (Focus Faro 3D) in order to compare the microrelief of the mound with the geophysical (see report on the Geophysical Survey, this volume) survey (Figures 19.7-8). In this case the laser scanner has recorded the ground surface in the same area of the mound where geophysical prospections were processed during the 2012 fieldwork (see report on the Geophysical Survey, this volume).

The micro-topographic model generated by the laser scanner is able to identify and visualize some features/segmentations of the terrain and ground contour levels not visible to the naked eye (Figure 19.9). The DEM had originally about 1 million of points (before interpolation) with a resolution of 1 cm. Even if it is still a work in progress, hillshade and krigging interpolation show several orthogonal and square outlines that could be identifiable as Neolithic houses (Figure 19.9). A second step of the digital experiment was the superimposition of the DEM on georadar data (Figure 19.8). In this case several anomalies of the georadar prospection overlap with several DEM linear features. Therefore it is very likely that they are identifiable as Neolithic houses.

Figure 19.7. Satellite imagery (Landsat 5 ETM) with the area of survey (laser scanning and georadar)

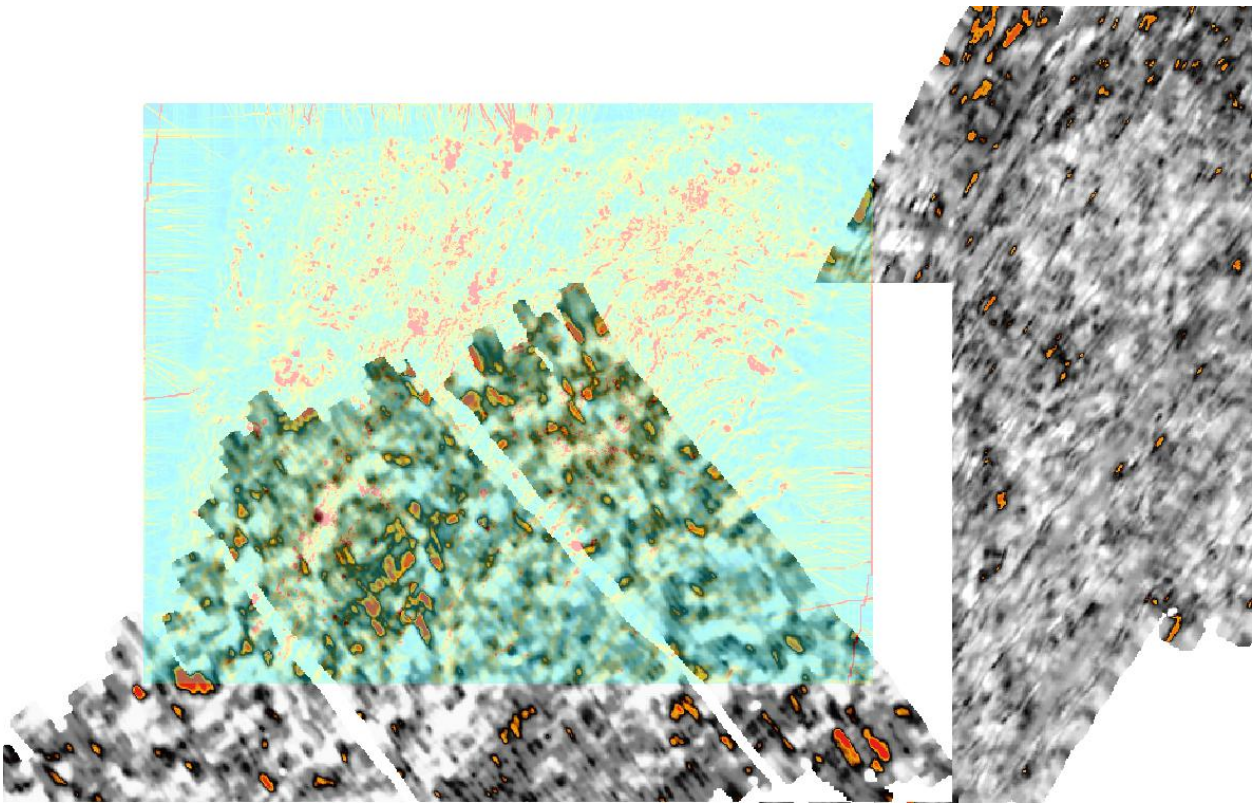

Figure 19.8. DEM (in pseudocolor) superimposed on georadar prospection (gray and orange)

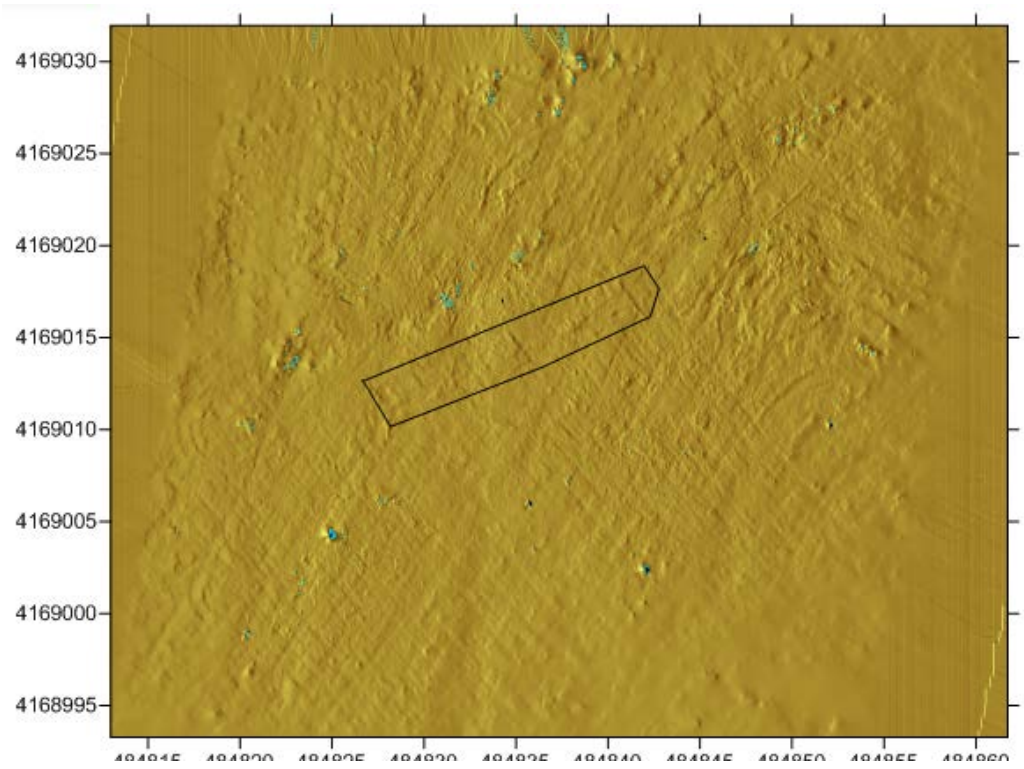

Figure 19.9. DEM interpolation with identification of linear features (possible houses)

Acknowledgments
Trimble Navigation, Scott Haddow, Stefano Campana, Gianfranco Morelli and all our students for their dedication and efforts.

20. Modelling Chronology

Alex Bayliss & Shahina Farid

As far as the Scientific Dating Team is concerned, the 2012 season produced two long-awaited highlights. First, was the completion of the excavation of a 'spine' of deposits through the South Area – an objective towards which excavation in this area has been directed since 2009. This means that the various sections of the matrix on which Shahina has slaved for more than a decade can finally be stitched together to form the first version of the Great South Matrix. This will allow us to complete the selection of the series of radiocarbon samples through the whole mound, which will form the framework for the chronological model of the east mound. Second, was the sampling of over 40 animal bones from Mellaart's excavation – including samples from key buildings in the South Area 'spine' where only limited amounts of material have been recovered by the recent project. Samples were also recovered from within the Shrine 29 stack of buildings and intervening midden, for example. We now have a continuous sequence of samples here from Levels VI to XII. This includes material from E.XII.29, which is currently probably the earliest building excavated at Çatalhöyük.

Thanks to the help of Adrienne Powell, a further 158 samples of articulated animal bone were identified as suitable for dating this year. Scott Haddow again assisted in providing an additional 23 samples of human bone. In a new departure, following promising results from the TP Area and the stratigraphic definition of the central 'spine of the South Area model, we identified a number of samples of charred plant remains from ovens and hearths which may provide suitable material for dating in key areas of the site where collagen preservation is particularly poor. Because of the uncertain taphonomy of this material, and thus the need to date two single-entity short-life samples from each deposit dated, this is an expensive strategy that we will apply selectively. It will, however, alleviate our reliance on dating bone collagen and provide a welcome scientific check on the accuracy of our protocols for dating this material.

As ever, the majority of work on the dating programme takes place off site. In July the radiocarbon dating team met to discuss progress at the 21st International Radiocarbon Conference in Paris. Alex updated the science team on the emerging models for the TP and South Areas, and discussion focussed on the most effective replication strategy, especially given the generally poor collagen preservation on the site and our difficulties in effectively pre-screening bones for successful dating here (Brock et al. 2012).

During the spring and summer Alex concentrated on completing her catalogue of buildings recorded by James Mellaart (three years in the making!). This includes not only all published sources, but also a digest of the information contained on a new series of original plans kindly loaned to the project by Mellaart before he died. There are over 30 of these. Many are larger scale originals of plans that have been published, but others show buildings which do not appear at all on published plans (most notably those in Area F; Figure 20.1). Critically a number of these plans also show pegs of the 1965 site grid. Once this catalogue was complete, Alex was able to advise on the minimum number of plans that should be digitised in order to tie in all the recorded buildings at the maximum scale possible. This digitisation work is now being undertaken by Cordelia Hall. In October, Alex and Shahina met with Cordelia to discuss how the various Mellaart plans can best be tied together (this will then be tied in to the Great South Matrix). This work is critical in expanding the dating project away from single strand of buildings

and spaces excavated by the Hodder team that will be form the 'spine' of the dating model, so that questions of variation in contemporary practice across the settlement can be addressed.

Figure 20.1. Previously unpublished plan of Levels V (red) and VI (green) from Mellaart's 1965 excavations in Area F.

In mid-September, the final radiocarbon dates from the TP Area were reported. Alex met with Arek Marciniak and Marek Barański in Poznań (special thanks to Katya for her wonderful Polish cuisine!). We had a very productive visit to the Poznań Radiocarbon Laboratory, which allowed us to resolve some contextual queries and further discuss the difficulties of collagen preservation at Çatalhöyük. Detailed stratigraphic analysis enabled us to combine the radiocarbon dates with the archaeological sequence, and we were able to construct the final chronological model for the TP Area.

Reference

Brock, F, Wood, R, Higham, T F G, Ditchfield, P, Bayliss, A, and Bronk Ramsey, C, 2012 Reliability of nitrogen content (%N) and carbon:nitrogen atomic ratios (C:N) as indicators of collagen preservation suitable for radiocarbon dating, *Radiocarbon*, **54**, 1–8

21. Anthracology Archive Report 2012

Eleni Asouti and Ceren Kabukcu, University of Liverpool

Vegetation and woodland management history

Following the most recent period of excavation and publication cycle the anthracology team was expanded with the addition of Ceren Kabukcu who has started her PhD project with Eleni Asouti at the Department of Archaeology, Classics and Egyptology of the University of Liverpool. Ceren's project researches the long-term development of cultivation and pastoralism in the Konya plain from the Aceramic Neolithic to the Chalcolithic periods (9^{th}-6^{th} millennia cal BC) and their ecological footprints on past vegetation. The Konya plain provides an ideal setting for investigating in a closely controlled ecological and cultural context early-mid Holocene landscape changes and how they related to economic and sociocultural shifts. This is because, unlike other areas in Southwest Asia, it contains a suite of well-excavated and sampled archaeological sites and a concentration of high-resolution off-site palaeoecological archives. For this phase of the anthracology project, data collection will incorporate new and previously published charcoal and seed botanical evidence from all excavated sites dating to the time period in question, focusing primarily on Pınarbaşı, Boncuklu, Çatalhöyük and Can Hasan. These datasets alongside geomorphological evidence, extant soil maps and palaeoclimatic records will be analysed with pattern-seeking statistical methods, in order to explore spatial and temporal distributions in cultivation/gathering practices and agroecology.

At Çatalhöyük, intensive laboratory work currently underway is focusing primarily on expanding the existing charcoal dataset (published in Asouti 2005, in press) to include more midden flot samples in order to increase the temporal resolution of the extant charcoal sequence. Furthermore, parameters other than taxon identification are systematically recorded: these include recording in a systematic way wood curvature measurements as well as qualitative analysis of growth ring morphology and deformations. Both methods alongside traditional botanical identification of charcoal fragments are aimed at refining our understanding of prehistoric firewood selection and woodland management practices (e.g., copping, pollarding, wood pastures, etc.)

During the 2012 field season charcoal was pulled from 86 flotation samples for further analysis: 13 samples from the North Area, 4 from TPC and 69 from the South Area. Of these samples 12 represent single burning events (e.g. firespots) and 74 are midden samples. Wood charcoals from these samples are currently being analysed at the archaeobotany lab of Liverpool University, alongside materials available from previous seasons. Furthermore 23 samples retrieved from carbonised timbers were exported to Liverpool for laboratory analysis. Research on these samples is ongoing and results will be reported in future archive reports and publications.

Worked wood

During the 2012 season we recorded a number of finds of carbonised worked wood which are continuously turning up from the later Neolithic levels currently excavated. Asouti (in press) discusses at length the range of artefacts uncovered thus far and their manufacture process and technological characteristics. Here we are simply presenting an initial summary of our first finds for 2012 and a preliminary assessment of this evidence, with emphasis on documenting the

stratigraphic associations and context of the artefacts, and their taphonomy. Full descriptions, measurements and a discussion of the production process and technology will be presented in future publications.

Unit (20458), sp. 96, B113

Figure 21.1. The wooden "plank" in space 96.

Excavators have recorded this unit as an "ashy infill". What we were called to examine and record in situ was actually a piece of burnt flat wood, possibly the remains of (structural?) plank-like timber (Figure 21.1). The timber was identified to be deciduous oak (*Quercus* sp.) We cleaned it as much as possible and defined its edges in order to be able to determine the nature of its surface (whether it comprised one or more different pieces), shape, direction of the grain, orientation, tilting, any traces of processing, polishing or paint, etc. The plank had been split from a single trunk of ~40-50 cm in diameter (minimum estimate) following the direction and (wavy) shape of the grain. The piece was positioned in whitish-cream coloured plaster which was underlain by a layer of burnt dark grey coloured clay. There was a roundish piece of wood charcoal sitting right on the whitish plaster just north of the timber piece. This was identified to be juniper (*Juniperus* sp.). Both pieces had weakly curved rings (denoting their origin from timber size wood). The assemblage might have formed part of roof armature, although this is entirely speculative since we did not find any other material of similar nature associated with them.

Unit (19571), F.3649, sp. 95, B.113

Figure 21.2. Pistacia wooden point 20138.x1

Unit (19571) is the infill of bin F.3649. In it was found a carbonised wooden pointed object made out of *Pistacia* (terebinth) round wood (moderately curved rings) (Figure 21.2). Its shape is sub-conical with an oval base (total preserved length 19cm – likely length from the traces left on the ground 23cm; preserved base width: 2.9cm, preserved tip width: <1cm) length. The object was lying parallel to the eastern wall of bin on its northeastern corner, but not in contact with it. Its pointed end was facing the northeast corner of the bin. It should be noted here that the neither the infill nor the walls of the bin seemed to be burnt.

Unit (20459), F.3650, sp. 95, B.113

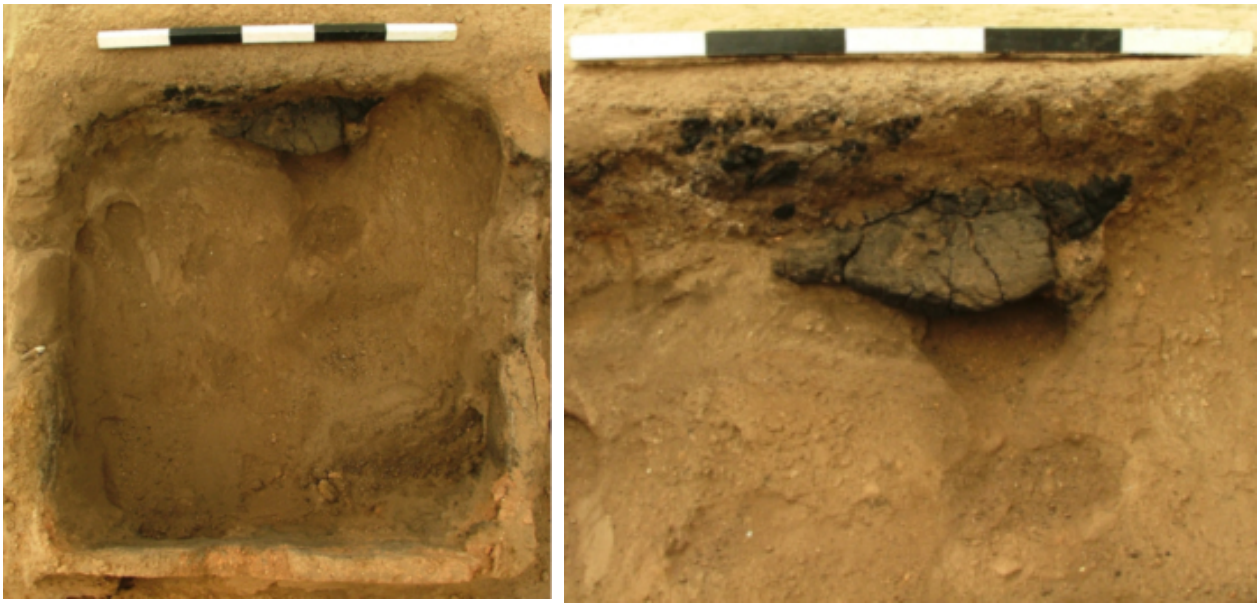

Figure 21.3. The mustard seed "bag"

A carbonised mustard seed "bag" was found protruding from the fill (20459) on the northern side of bin F.3650. The bin and its infill postdate F.3649 and (19571). The mustard seed lump was oval in shape (260x90x50mm) with flat surfaces (see Figure 21.3); hence we assume that the seeds had probably been stored in a leather or other flat-surface container. There was a charcoal concentration immediately above it, in a tilted position, which suggests that it might have been hanging from the bin wall and fell inside when the bin was burnt. The contents of F.3650 were burnt as opposed to the condition of F.3649.

Unit (19568), F.3685

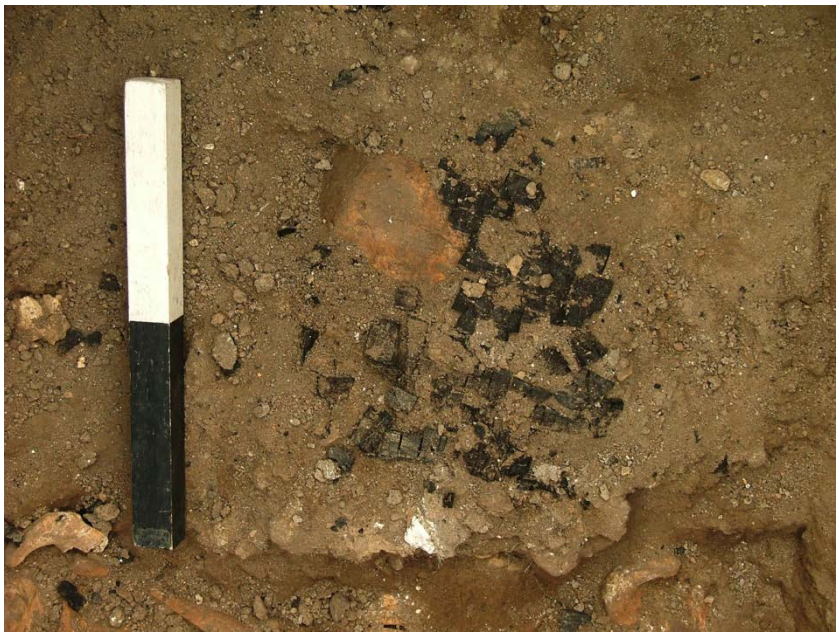

Figure 21.4. The post-Neolithic burial with possible evidence for the intentional burning of substances deposited inside the grave

A post-Neolithic burial (F.3685) contained a cluster of charcoal (19568) (**Figure 21.4**). The cluster covered the facial area of the skull of an adult woman skeleton (19569). Cleaning and close inspection of the surface of the cluster confirmed that it formed a single piece of Salicaceae (willow/poplar) thin flat wood (akin to bentwood) that had been charred in situ. Due to this observation, the fact that that there was no evidence of widespread charcoal presence in different parts of the grave, and the absence of burning traces on the skeleton itself (as advised by the human bone lab team) we concluded that the charcoal could not have been

deposited there as a result of the post-burial destruction of a wooden coffin by fire. The most parsimonious explanation seems to be that a thin wooden vessel (possibly containing incense or some other slowly burning substance alongside live embers) had been deposited in the grave and allowed to burn slowly until the walls of the vessel were converted to charcoal. There has been a suggestion that the adult female buried in F.3685 was of non-local origin, and that her burial denotes a person of prestige given the nature of the burial gifts associated with her, especially the bottles that had been deposited under and around her head. She might have been (although there is no way of confirming or refuting this proposition) a healer, or a person with exceptional skills in dealing with medicinal or other substances.

Unit (20419), sp. 40, Building 102, F.3667

Of the all the carbonised wood craft finds at Çatalhöyük during the 2012 season the wooden beads associated with skeleton (20419) of burial F.3667 were the most spectacular, adding considerable detail to the expanding woodworking repertoire of the site (Figures 21.5.-21.16). Wooden round and flat beads had not been found before at the site. Due to the high levels of finish and polishing it was not possible to identify the botanical species of the wood used for their manufacture. The rarity of such finds on prehistoric sites and their (even rarer) preservation in carbonised form are probably the reasons why the excavators originally identified them as made out of stone. The most important question however relates to the manner of burning and their deposition inside the grave context. According to the excavators they were found near the mandible to the first skeleton (hence the most recent one) that was excavated in this space very near the modern surface. They were also carbonised yet preserved in remarkable detail, which suggests their slow, incomplete burning resulting to carbonisation. In parts they also appear to be only superficially carbonised, having retained to a certain degree the original brownish colour of the wood. So the question remains how and why they were carbonised in the first place, especially in the absence of evidence for direct or indirect heat impact on the skeleton and the general burial context themselves. Two options are possible: (a) that they were partially burnt after their manufacture for hardening the wood and create a visual impression of a black, tough surface, or (b) that they were burnt elsewhere and re-deposited as a result of disturbance of the grave context and intrusion from contemporaneous, earlier and/or later deposits, depending on the stratigraphic resolution of their context of deposition. However, the fact that they can be refitted to re-assemble whole beads, alongside the general technological characteristics of the wooden bead cluster would seem to suggest that it represents a single bead assemblage, corresponding to a distinct depositional event, most likely corresponding to a primary deposit.

Below follows a list of the finds and their measurements (please note that while on site it was only possible to take photos using a non-digital scale; in turn including a scale did not display a suitably large surface exposure when photographing these tiny beads with a conventional digital photo attachment to the microscope; for this reason measurements are listed below in order to provide a better understanding and appreciation of the true dimensions of these very small objects).

20419.1 (Figures 21.5-6)	Half, compressed round bead; length (parallel to the drilled perforation canal) 8.33mm (length of hole 8.12mm); max width 9.56mm, max thickness 5.36mm; perforation canal width was measured at 3 points: proximal end 2.93mm, midpoint: 2.05mm, distal end 2.85mm; the round lateral surface of the bead was polished and had chipping and impact/wear marks visible on it. It was cut following the grain of the wood. There is a vertical crack running along one of the lateral edges and some minor ones, possibly due to stresses incurred during drilling.
20419.2 (Figures 21.7-8)	Half, compressed round bead; lateral round surface with chipping marks and overall size/dimensions matched exactly upon refitting bead 20419.1; length (parallel to the drilled perforation canal) 8.44mm (length of perforation canal 8.24mm); max width 9.25mm, max thickness 5.83mm; drilled hole width was measured at 3 points: proximal end: 2.38mm, midpoint: 2.14mm, distal end: 1.78mm; the round lateral surface of the bead was polished and had chipping and impact/wear marks visible on it. It was cut following the grain of the wood.
20419.3 (Figures 21.9-10)	Half, compressed round bead; lateral round surface with chipping marks and cracked around the proximal end of the perforation canal and perpendicularly to it (2-3 cracks) most likely a result of drilling. Length (parallel to the perforation canal) 8.55mm (length of perforation canal 8.16mm); max width 9.91mm, max thickness 5.39mm; width of perforation canal measured at 2 points: proximal end: 1.75mm (nearest to tension crack), distal end: 2.35mm with a smaller crack near it.
20419.4 (Figures 21.11-12)	Half, compressed round bead; refitting with 20419.3; length of drilled perforation canal 5.92mm; the perforation canal does not perforate the distal end of the bead as it was drilled obliquely to the vertical axis of the pre-form; proximal end width of perforation 2.78mm, distal end 1.54mm. Bead Length: 8.26mm; width: 9.66mm; thickness 4.18mm. Tension damage evident by cracks running parallel to the perforation canal.
20419.5 (Figure 21.13)	Flat circular to sub-circular bead with slightly rounded vertical edges and a rough finish over its lateral surfaces which are not polished. Single perforation through its centre. Length: 9.67mm, width: 9.02mm, opening of perforation in the middle of the bead: width: 2.25mm, thickness 2.81mm. The bead was sawn off at a slight angle, creating sawing marks (parallel lines on the flat sides, very pronounced on one lateral side), and a drilled, cone-shaped perforation through its centre. A very thin, hair-like groove was cut along the circumference of the bead, effectively slicing it in two parts. Possibly the fragment of a larger layered flat bead as it seems to be refitting with 20419.6-8 or, more likely, part of a single bead assemblage that were attached to the same medium
20419.6 (Figure 21.14)	As above but consisting of only one wood slice. Length: 9.48mm, Width: 7.62mm, Thickness: 1.01mm; size of perforation: 2.13mm; bead was chipped a little along its edge.
20419.7 (Figure 21.15)	As above but consisting of only one wood slice. Length: 9.60mm, Width: 7.91mm, Thickness: 1.59mm; size of perforation: 2.59mm; it matches with beads 5, 6 and 8, so it might be a piece of the same bead/bead assemblage.
20419.8 (Figure 21.16)	Similar 2014.7 but only about half of it is preserved; one lateral surface of the bead was polished and slightly curved while the other bore the usual saw marks. Possibly the end part of the same bead assemblage (thus possibly representing part of the same bead as 5, 6, 7; or – perhaps more likely part of a single sequence of beads attached on the same medium). It was not possible to observe the direction of the grain on any of these flat beads as it had been completely obliterated by burning, polishing and sawing. Preserved length: 6.64mm, width: 8.43mm; size of perforation: 2.23mm.

Figure 21.5. Bead 20419.x1 – lateral surfaces: (A) drilled perforation, (B) polished surface with impact and chipping marks

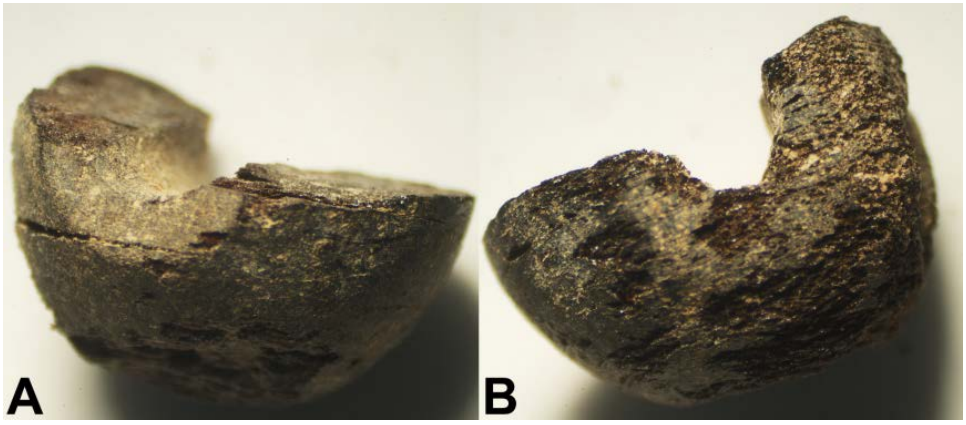

Figure 21.6. Bead 20419.1 – proximal (A) and distal (B) surfaces with drilling mark (A) and impact/chipping marks and tension cracks (A & B)

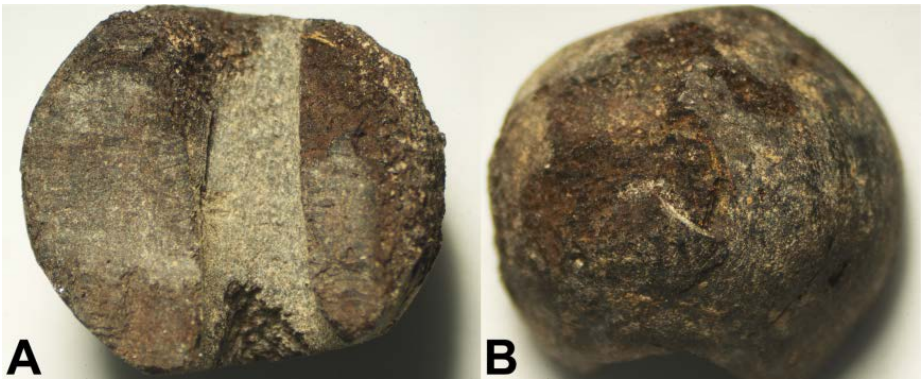

Figure 21.7. Bead 20419.2 – lateral surfaces: (A) drilled perforation, (B) polished surface with impact and chipping/wear marks

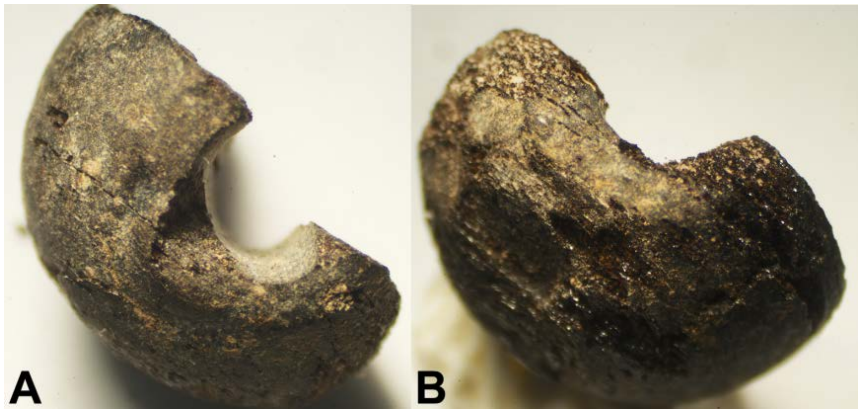

Figure 21.8. Bead 20419.2 – proximal (A) and distal (B) surfaces with drilling mark (A) and impact/chipping marks and tension cracks (A &B)

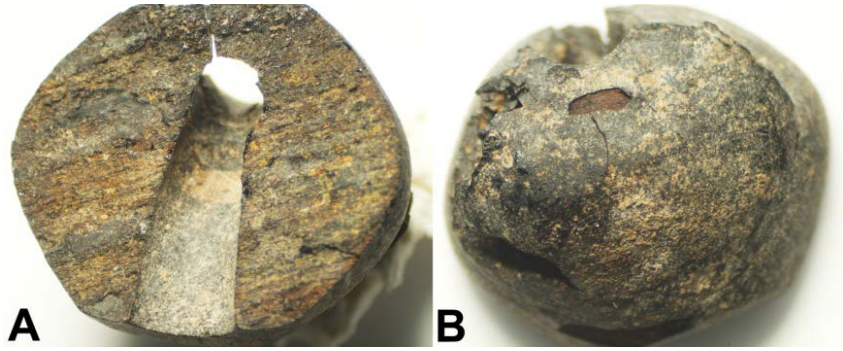

Figure 21.12. Bead 20419.3 - lateral surfaces: (A) drilled perforation, (B) polished surface with cut marks and impact marks/cracks.

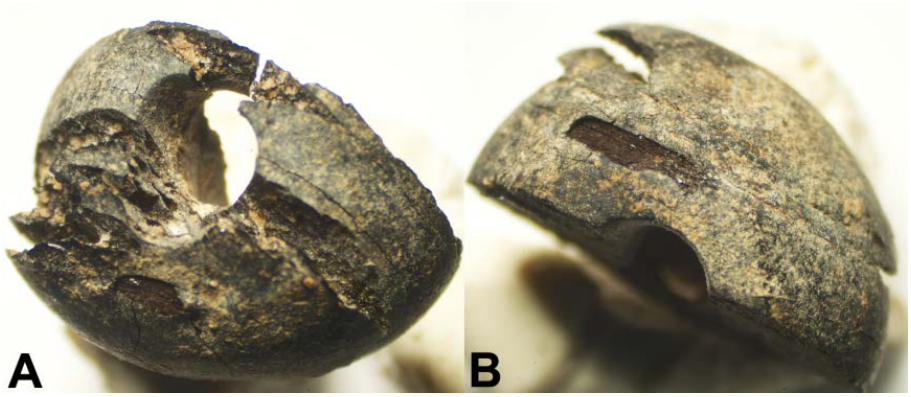

Figure 21.11. Bead 20419.3 – proximal (A) and distal (B) surfaces with drilling mark and compressions/tension cracks caused by drilling (A) and cut mark and tension cracks (B)

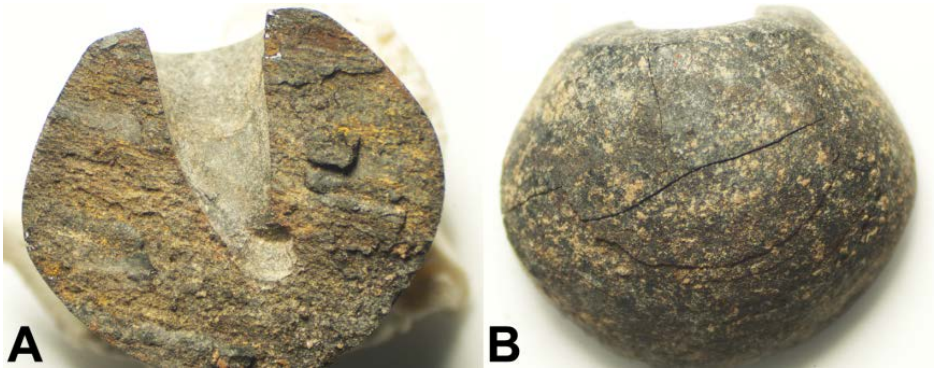

Figure 21.10. Bead 20419.4 - lateral surfaces: (A) obliquely drilled perforation, (B) polished surface with post- depositional cracks.

Figure 21.9. Bead 20419.4 – proximal (A) and distal (B) surfaces with drilling mark and compressions/tension cracks caused by drilling (A) and tension cracks (B)

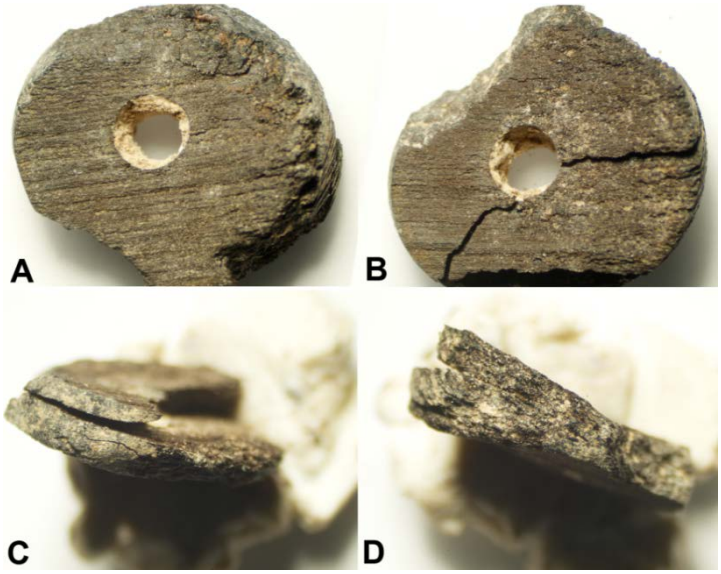

Figure 21.16. Bead 20149.5: Upper and lower surfaces (A & B) and rounded, "sliced" lateral edges (C & D)

Figure 21.15. Bead 20419.6 – Upper and lower surfaces

Figure 21.14 Bead 20419.7 – Upper and lower surfaces

Figure 21.13. Bead 20419.8 – Upper and lower surfaces

Unit 19802, between walls fill (B.80, sp. 135 & B.76, sp. 137)

Figure 21.17. Bead (pre-form) 19802.1 – Lateral surfaces

A single bead pre-form (un-perforated) was recovered from this context containing a (primary?) dump of animal bone, ground stone and firewood remains (the latter containing a number of twigs as well as larger pieces of charcoal) (see also Figure 21.17). The preform has been identified as Juniperus sp. (juniper) and is the first bead of this type that could be botanically identified. The surface is not polished but rather the natural grain and robustness of juniper wood are emphasised with the rough finish of the outer curved surface.

Unit 20138, sp. 496, F.3917

A wooden pendant found in the infill (20138) of pit (F.3917; shallow pit filled with charcoal, bone, pottery and stone) in space 496 of the TPC area. Its upper flat surface is polished possibly with some kind of ground stone; the lower surface is rough and unpolished. There is also a groove possibly the result of woodcutting and shaping the pre-form and knifing cuts along the upper end of the surface. Photographs of this find were taken during the season and will be published at a later stage when analysis of materials from TPC area is completed.

22. Starch Analysis of Ground Stone

Huw Barton, University of Leicester

This will be the second major study of starch granules at the site of Çatalhöyük following the earlier work of Hardy (2007). This study will focus on the extraction of starch granules from ground stone to aid in the study of tool function as well as to help clarify what foods were actually processed for consumption at this site. For an introduction and general background on the history and utility of starch studies in archaeology see Torrence and Barton (2006) and for the aims of previous studies at Çatalhöyük see Hardy (2007) and van de Locht & Hardy (2009). Previous work concentrated on the recovery of starch granules from a variety of site sediments including house floors and walls, but only had limited success with the recovery of starch from ground stone (Hardy *et al*. in prep.).

The aims of this study will integrate with the technological and contextual study being conducted by Christina Tsoraki [see Ground Stone report]. The primary aims of this pilot study have been to select a variety of ground stone forms including upper and lower grinding tools (grinders and grinding slabs) to provide an overview of starch granule preservation. The poor recovery of starch noted by Hardy *et al*. (in prep.) could result from a variety of factors including unknown taphonomic factors that do not favour the preservation of starch at this site. To aid in the recovery of starch a slightly more aggressive sampling strategy has been adopted.

Sampling methodology

A total of 17 tools were selected for analysis with a total of 65 micro-samples taken from the assemblage overall (Table 22.1). Each tool was sampled multiple times as starch preservation is not predictable across the surface of any artefact; many samples may not produce starch while one sample may produce relatively high quantities of material.

In this study all tools, except the very largest (N=4), were first scanned under low magnification, x8-x50, using a Nikon SMZ645 to identify likely areas for sampling. If possible it is preferable to identify patches of staining or plaque-like deposits that might indicate the presence of an in situ residue; the presence of fungal filaments is also a useful guide to the presence of organic matter. No such deposits were noted on the sample assemblage. The next stage involved identifying deep pits or cracks in the tool surface. These areas were targeted for sampling in the hope that there may be preserved organic deposits sealed within. The sediments were disturbed with the tip of an acupuncture needle to loosen the sediment matrix and also, gradually, to excavate deep into that matrix. Depending upon size of pit, either 5-10 microlitres of filtered water added to facilitate removal of sediment. This may be repeated up to four times to recover a minimum of 20 microlitres. Between pipetting, sample area may be re-agitated with point of needle to loosen new surface. Samples were placed into 1.5 ml snap cap vials for transport to the UK for analysis.

Table 22.1: Çatalhöyük Starch Sampling Summary

Unit number	Find number	Building number	Space number	Type	Surface washed	Number of micro-samples	Number of sediment samples
18592	X1	79		Polisher	Yes	3	
19392	X2		470	GS Fragment	No	4	1
19392	X3		470	GS Fragment	No	2	1
19218		97		Mortar	Yes	5	
17383		79		GS Fragment	Yes	3	
18421		76		Grinder	Yes	4	
18595	X1	79		Grinder (fragment)	Yes	3	1
18595	X2	79		GS Fragment	Yes	3	1
18595	X3	79		Grinder	Yes	3	
18596	X1	79		Grinder	No	3	1
18545	X2	79		Grinding slab	No	6	
19003				Grinding slab	Yes	3	
18947	X1	80		Grinder	No	3	
16492	X14			Grinding slab	Yes	7	
11965				Grinding slab	Yes	4	
16454				Grinding slab	Yes	4	
17547				Grinding slab	Yes	5	

Combined starch and phytolith protocol

An attempt will be made to combine the recovery of starch granules with the recovery of phytoliths from some of the ground stone micro-samples. This will involve separating starch and phytoliths from one of the 20 microlitre ground stone samples using a heavy liquid (Sodium Polytungstate). This approach should provide complimentary data as phytoliths are particularly useful for detecting certain parts of the plant such as epidermal tissue, leaves, and other plants high in phytoliths, but with low starch counts. Starch granules are concentrated in specialised storage organs within the plant such as the seed kernel or parenchyma tissue of tubers, which do not contain phytoliths. In combination these techniques might also provide useful

information about tool use biographies, such as whether some grinding tools were initially used to remove or de-husk seeds before grinding the kernels into flour or paste.

Charred parenchyma and animal dung

A small pilot study will also be conducted on the possibility of starch granule preservation within the cellular matrix of charred parenchyma of roots and tubers and also within animal dung. If the temperatures of plant and dung charring did not result in the charring of all starch granules or if some granules were preserved in a protected context, it might be possible to recover intact native granules to facilitate taxonomic identification of plant tissues.

Preliminary Results

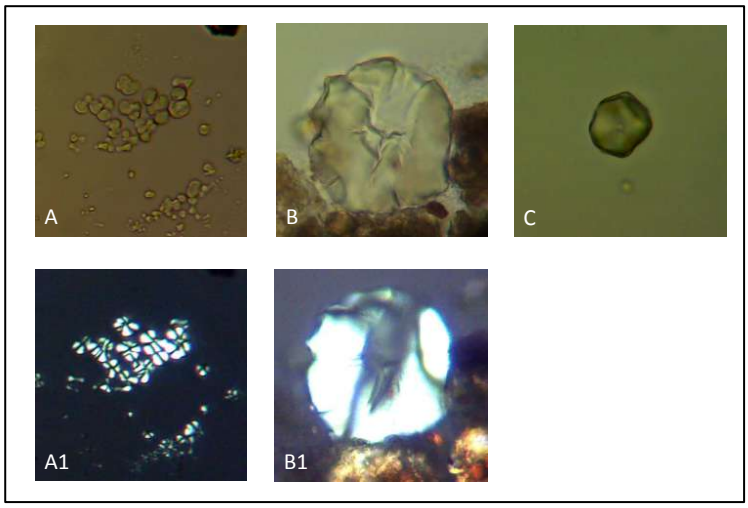

Figure 22.2. Starch granules recovered from ground stone tools, A-C from Cms002. A) A cluster of small irregular compound starch granules. A1) Same, under cross-polarised light. B) Large ovate granule, eccentric, badly degraded; possibly from a type of tuber or root. B1) Same, under cross-polarised light. C) Polygonal granule, centric, recovered from Cms002 and Cms032 (Table 22.2).

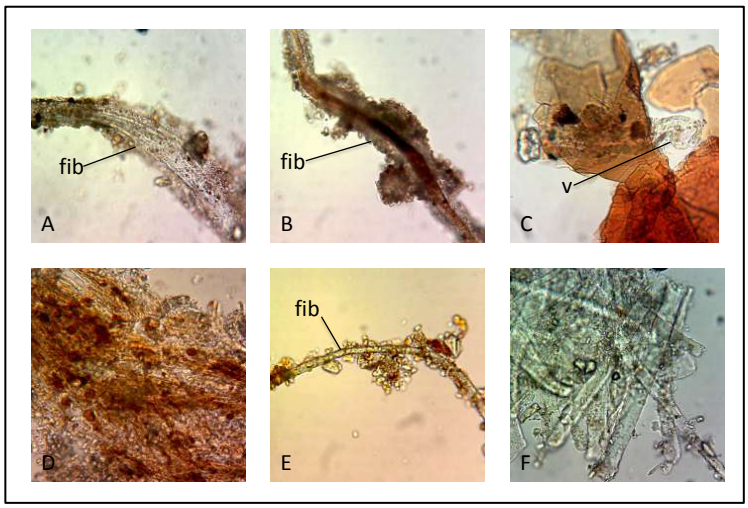

Figure 22.2. Plant tissues recovered from ground stone tools. A) Degraded fibre, Cms065. B) Partially mineralised fibre from Cms065. C) Well preserved vessel element within a mineralised plaque. D) Badly degraded sheet of cellulose tissue that has been infected by fungi. Small red inclusions are likely to be fungal spores. E) Narrow fibre coated in small particulates. F) Mass of vessel elements and fibre fragments; possibly the result of grinding a fibrous, but relatively soft plant material.

In order to provide some preliminary results of the nature of organic preservation on the ground stone a total of 12 sub-samples were mounted for light microcopy (Table 22.2). Residues identified included starch granules from three distinct morph-types representing three different plant sources (Figure 22.1A-C), fragments of plant vascular tissue (Figure 22.2A-C, E, F), degraded cellulose (Figure 22.2D), crystal druses from plants, phytoliths (Figure 22.3A, B), fragments of fungal filaments (Figure 22.3C), and mammal hair (Figure 22.3D).

Each sub-sample was a 10 microlitre extract from the original 20 microlitre tool samples. Each slide was scanned at a magnification of x100 in plain and polarised light and items of interest were photographed at a magnification of x400. The software was not unable to provide a scale bar, nor could measurement in microns be taken.

In general it appears that organic preservation is poor. There is little cellular tissue present on each slide and when detected it is often in a poor state of preservation. Fibres are often badly degraded and sheets of cellulose tissue infected and degraded (Figure 22.2D) and appear

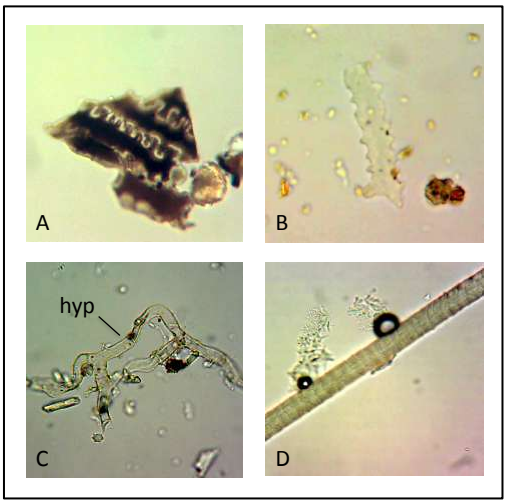

Figure 22.3. Range of other residues recovered from ground stone. A) Articulated burnt phytoliths. B) Wavy rod phytolith. C) Fragment of fungal hyphae. D) Mammal hair.

to be losing their original structural integrity (Figure 22.2A) or are becoming mineralised (Figure 22.2B). Interestingly, those fibres coated in fine particulate matter (e.g. Figures 22.2A, B, E) appear more degraded than tissues where these adhering minerals are absent. Possibly, the coated fibres are from the adhering sediment matrix, while the cleaner material (e.g Figure 22.2C, F) was derived from protected microenvironments on the tool surface. The sample Cms054 (11965) contained a small concentration of vascular tissue and fibre fragments that is strongly suggestive of having derived from working a soft, but fibrous plant material. This sample also contained a mass of degraded cellulose tissue as well as fragments of fungal hyphae. The presence of fungi is usually a good sign that organic residue was present on this tool at the time of deposition.

It appears that there are two major processes of tissue degradation operating at this site. Some tissues have been infected by fungi and partially broken down until the fungi became inactive and died (e.g. Figure 22.2D; 3C). In other examples it seems that other chemical processes are actively degrading tissues and destroying cellular structure.

Table 22.2: Preliminary Starch Residue Results

Sample number	Unit Number/GID Number	Starch count	Other residues
Cms024	19218	0	
Cms032	18596.x1	1	Fragments of vascular plant tissue
Cms002	17383	>20	Three ‘types’ of starch present
Cms006	18421	0	
Cms037	18545.x1	0	
Cms050	16492	0	
Cms052	16492.x14	0	Crystal druse; odd cellulose mass
Cms019	18595.x3	0	
Cms059	16454	0	Mammal hair
Cms058	16454	0	
Cms054	11965	0	Fibre/vessel mass; rotted cellulose
Cms057	11965	0	Fragments of vascular plant tissue

Starch

Three distinct starch morpho-types (small irregular compound granules, Figure 22.3A; large ovate with an eccentric hilum, Figure 22.3B; medium polygonal with a centric hilum, Figure 22.3C) were recovered from two ground stone tools. One of these, Cms002 (17383) contained all three types (Figure 1A-C) including a starch cluster (Figure 22.1A). A single polygonal granule identical to 3C was recovered from Cms032 (18596.X1).

The recovery of some starch from these samples shows that starch is preserved on ground stone tools and that at least three different species of plants are represented by the assemblage recovered here. It also shows that at least one ground stone tool was multifunctional and used to process a variety of plants; none of which were cereals. In fact, the absence of cereal type starch is a little unexpected, though sample size is small (a 10 microlitre sample from a single tool) and the field equipment limited the quality of the analysis. Further analyses will be conducted in the Starch and Residue Laboratory in the School of Archaeology and Ancient History, University of Leicester, UK.

Other residues

Other residues recovered included phytoliths (Figure 3B), articulated burnt phytoliths (Figure 22.3A), and crystal druses (derived from plants). A single mammal hair was recovered from Cms059 (16454) thought likely to be intrusive to the stone tool, derived from the adhering soil.

Conclusions

These preliminary results will be followed by a more intensive study of the 66 micro-samples taken from the ground stone assemblage at Çatalhöyük in Leicester. Overall, these results are promising, demonstrating the existence of starch granules on the ground stone and the presence of other plant residue including vascular tissue, fibres and phytoliths. Interestingly, no pollen was noted in any of the samples.

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23. Chert Sourcing

Adam Joseph Nazaroff, Stanford University

Introduction

This report is an update of a recent provenance program focused on objects of chert – a sedimentary rock comprised of microcrystalline or cryptocrystalline silica, generally in excess of 90-percent (Lowe 1999; Luedtke 1992) – from Çatalhöyük. Research has focused on objects from the Neolithic contexts of the East Mound, and has aimed to understand the nature of chert-use on-site: the diversity of chert sources used through time by site occupants, differential access to source-material(s), and the manner of chert consumption. This research has been conducted in conjunction with the Anatolian Archaeological Raw Material Survey (AARMS), a large-scale survey and provenance project which studies the economic and social uses of geologic resources in ancient Anatolia. Additional research complemented by data obtained from AARMS seeks to better understand the intricacies of chert procurement behavior during the Neolithic by questioning how chert procurement strategies may have been embedded in other behaviors which took place off-site (Binford 1979), and how the physical attributes of each source (nodule size, accessibility, etc.) may correlate with the different quantities and uses of their respective materials at site. This is made possible by locating and studying chert source locales in the Konya Basin and other regions of Central Anatolia.

I will limit discussion in this report to the most recent attempts at understanding source representation on-site. This discussion will focus on the visual and geochemical analysis of a subset of 648 chert artifacts from Neolithic contexts in the South Area and North Area excavations. Later reports and publications shall include more in-depth discussions of the nature of chert source-use on-site, changes in these behaviors through time, and a more thorough presentation of affiliated datasets. Research pertaining to specific chert sources studied by AARMS will also be reported elsewhere.

Analytical Methodology and Results

Two techniques have been employed in order to understand source representation on-site: Individual Attribute Analysis (IAA) (Milne et al. 2009) and portable X-ray Fluorescence (pXRF) (Nazaroff et al. 2010) analysis. While additional samples have been exported in order to undergo further instrumental analysis, the employment of IAA and pXRF analysis has allowed for the non-destructive analysis of multiple objects on-site. The combination of these analytical techniques offers information on the visual characteristics and trace elemental concentrations of cultural objects from Çatalhöyük. Milne et al. (2009) assure archaeologists of the utility of visually characterizing chert materials, especially as a first step in making qualitative sense of an otherwise diverse assemblage. Such approaches truly excel in regions where chert deposits are visually distinct from one another. Regardless, a combined approach of visual, mineralogical, and geochemical characterization is often preferable (Kendall 2010). Accordingly, I have made use of pXRF analysis in order to further characterize cultural materials. My decision to use non-destructive XRF analysis was based on instrument accessibility and the limitations placed on exporting samples. Because XRF has also formed an integral component of geological and archaeological studies which seek to discern the bulk chemistry of cherts (e.g. Girty et al. 1996;

Oliveres et al. 2009; Van Kranendonk and Pirajno 2004), I determined that XRF was an apt choice for non-destructive analysis.

IAA included measures of color (using the 2009 GSA Geological Rock-Color Chart as a means to standardized color-measurement), opacity, luster, texture, fracture properties, and inclusions. Terminology for opacity, luster, and texture was adopted from Luedtke (1992: 68-70). When samples contained multiple colors, each was recorded with its relative proportion and character of distribution (e.g. banded, mottled, etc.). Opacity, luster, texture, fracture properties, and inclusions were variable across both source and artifact assemblages. All measurements were taken in hand sample, and with the use of hand lenses (10x-20x).

Geochemical analysis was conducted on-site using a Bruker Tracer III-V pXRF instrument. The instrument was equipped with a rhodium tube from which X-rays are emitted and a peltier cooled, silicon PIN diode detector. Each sample was analyzed under two conditions to allow for the acquisition of major oxides Na_2O, MgO, Al_2O_3, SiO_2, K_2O, CaO, TiO_2, MnO, and Fe_2O_3, and trace elements titanium (Ti), manganese (Mn), iron (Fe), copper (Cu), zinc (Zn), lead (Pb), thorium (Th), rubidium (Rb), strontium (Sr), yttrium (Y), zirconium (Zr), and niobium (Nb). Under the first condition, samples were analyzed for 150 live seconds with the instrument operating at 15 keV and 25.0 µA from an external power source without the use of a filter. Under the second condition, analysis was conducted for an additional 150 live seconds, the instrument operating at 40 keV and 25.0 µA using a filter composed of 6 mil copper (Cu), 1 mil titanium (Ti), and 12 mil aluminum (Al). Samples were analyzed whole, and positioned with as much contact as possible to the instrument's surface; irregularly shaped samples were placed with the smoothest side positioned for analysis. This allowed for the greatest amount of X-rays possible to bombard the sample, optimizing the count rate and mitigating the effects of irregular sample surface structure on X-ray scatter. During analysis, the instrument was mounted in a Bruker designed plastic hold, allowing for fixed positioning during analysis and standardized the distance of each sample from the analyzer.

Energy counts were processed using the S1PXRF program developed by Bruker. Conversion to parts per million concentrations was achieved using a calibration program designed by Bruker (S1CalProcess). Several geological chert samples (n = 19) – whose trace-element chemistry had been derived from previous laboratory energy dispersive XRF analysis – were used in order to calibrate the pXRF instrument by comparing expected values with those produced during analysis. Furthermore, a single in-house obsidian standard was run each day in order to insure instrument stability (precision).

When choosing a suite of elements for provenance assessments, it is important to consider the possible origins and diagenetic processes affecting each element. During chert formation and diagensis, inclusions incorporated from the surrounding environment (eg. clays, carbonates, iron oxides, or organic matter) may alter trace element geochemistry (Luedtke 1992: 38; Murray 1994: 214). This process can be important for provenance research, as inclusions unique to different sources may be used to fingerprint particular deposits and match artifactual materials to such locales. For example, Murray (1994) has made use of multiple combinations of trace elements and elemental ratios in order to discriminate amongst chert deposits which formed under different environmental conditions. Chert sourcing programs can utilize these geologic histories (as recorded in the mineralogy and chemistry of a material) to make provenance

assessments (Doherty et al. n.d.; Lowe 1999; Malyk-Selivanova et al. 1998; Milne et al. 2009; Parish 2011). Mineral and chemical indicators provide information on characteristics unique to a material's host sediment. This informs researchers of palaeoenvironmental processes, or the parent material (dacite, volcanic ash, sandstone, etc.) of secondary silica deposits. The analysis of more mobile elements can also offer data on localized environmental conditions, diagenetic processes, or other local mineralogical and chemical variability which may leave an imprint on a particular portion of a formation (Murray 1994). Note that the bulk chemical analysis performed by XRF does not allow for the identification of the specific inclusions which account for the presence of a given element. However, this does not necessarily detract from the utility of the approach. Bulk chemical components allow for the discrimination of cherts from different formations (Malyk-Selivanova et al. 1998; Murray 1994), although cannot necessarily provide the fine-grained information necessary to distinguish cherts from different locales within a particular geologic unit.

TOTAL:	648	%
Unknown	95	14.66
Group 1	93	14.35
2	46	7.10
3	28	4.32
4	0	0.00
5	12	1.85
6	12	1.85
7	21	3.24
8	0	0.00
9	0	0.00
10	17	2.62
11	5	0.77
12	12	1.85
13	11	1.70
14	2	0.31
15	3	0.46
16	1	0.15
17	6	0.93
18	2	0.31
19	0	0.00
20	0	0.00
21	2	0.31
22	0	0.00
23	0	0.00
24	120	18.52
25	122	18.83
26	26	4.01
27	1	0.15
28	11	1.70

Table 23.1. Chert groups representation

Representation of different chert sources on-site was assessed through a step-wise process. First, IAA was used to discern 28 visual chert groups present within the subsample (Table 23.1). The geochemistry of each group was reviewed in order to assess if a given group may be further divided. Next, the geochemistry of groups with similar visual properties, such as radiolarian cherts or secondary cherts (Lowe 1999), was assessed to determine if it was possible to validate group division based on the IAA conducted. This is an ongoing process, one that is not without its difficulties. For example, the visual separation of groups 1 and 2 has not been supported by the current available geochemistry. However, the group of radiolarian cherts (group 25) has been further subdivided into 3 geochemical groups: R1, R2, and R3 (Figure 23.1). Hierarchical cluster analysis was performed in order to further validate the existence of these geochemical groups (Figure 23.2). In addition, the visual separation of groups 5 and 6 – both opaque and dark brown or black cherts – was further validated by geochemical analysis (Figure 23.3).

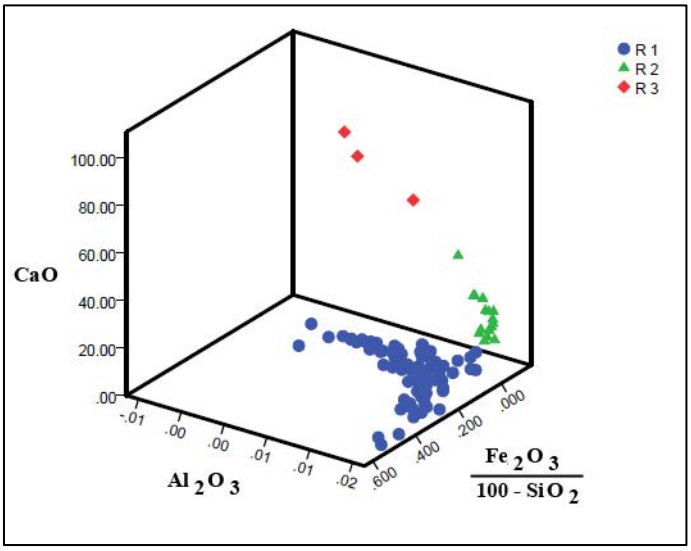

Figure 23.1. ***Multivariate plot of proposed radiolarian chert geochemical groups present in the subsample studied.***

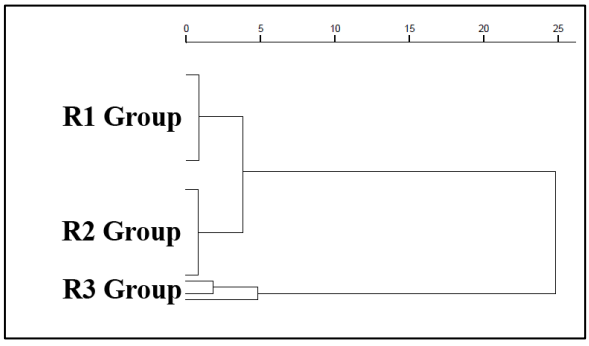

Figure 23.2. Dendrogram of hierarchical cluster analysis of radiolarian chert geochemistry, showing relationships among proposed geochemical groups.

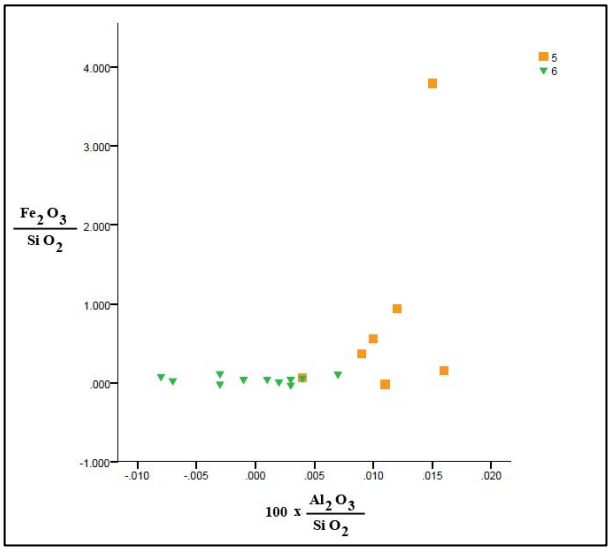

Figure 23.3. Bivariate plot of visual groups 5 and 6, showing separation based on geochemical data.

Radiolarian cherts are a highly siliceous material often formed by the alteration of radiolarian oozes (Calvert 1971) which themselves are the result of oceanic silica-secreting organisms (Luedtke 1992: 23). These cherts are present throughout Anatolia in affiliation with ophiolite formations, representing former oceanic accretionary complexes and the preserved relics of the Neo-Tethys and Paleo-Tethys oceans (Okay 2008; Robertson et al. 2004). Radiolarian cherts are one of the principle components of the Neolithic non-obsidian chipped stone assemblage at Çatalhöyük (Bezić 2007; Carter et al. 2005; Doherty et al. n.d.). Demonstrating the possible presence of radiolarian chert from multiple sources at Çatalhöyük offers a venue to further explore the intricacies of chert procurement and use during the Neolithic. There are 3 sources of radiolarian chert commonly discussed in the archaeological literature of Anatolia (Bezić 2007). Future research will focus on attempting to discern the quantitative use of these chert sources, and others, during the Neolithic.

Future prospects

More than 400 chert objects have been exported under permit to Stanford University, and are awaiting further geochemical and mineralogical analysis. In addition, samples collected from multiple chert sources in and around Central Anatolia are currently being analyzed using identical techniques to those discussed here. A more in-depth discussion of matching visual, mineralogical, and geochemical signatures between located chert sources and cultural objects from Çatalhöyük will inform us of use of specific chert sources by the Neolithic occupants of Çatalhöyük.

Understanding the different scales at which materials flowed challenges us to reorient our focus in order to account for procurement at

variable distances within and outside of Central Anatolia. At Çatalhöyük, much effort has been expended on understanding the use of woodland catchments (Asouti 2005; Fairbairn et al. 2005), pastoral environments (Pearson et al. 2007), ground stone (Baysal 1998; Türkmenoğlu et al. 2005) and clay deposits (Doherty 2008), although considerably less attention has been given to understanding the consumption of chert. Though a comparatively minor component of many lithic assemblages, chert is ubiquitously present at Neolithic sites in Central Anatolia (Bezić 2007). Understanding the distribution and use of chert offers a more thorough perspective on the role of diverse local practices in shaping the Neolithic. It is hoped that this chert sourcing program, conducted in conjunction with the recent and forthcoming work by AARMS, will confidently increase the evidence for the complexity of material procurement within Central Anatolia. This will offer an opportunity to explore how the procurement and use of chert resources may have differed among local communities. It can be assumed that through expanding our knowledge of resource availability and use, we will acquire a greater understanding of how the interactions with landscapes of varying scales facilitated variation in social developments, group dynamics, and technological practices.

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24. Çatalhöyük Fire Installations

Sheena A. Ketchum, Indiana University, Bloomington

During the 2012 field season, I continued my on-going dissertation research studying the fire installations (ovens, hearths, fire pits, fire spots, and fire scoops) at Çatalhöyük (Ketchum 2009, 2010). Through the course of my dissertation, I have been aiming to investigate how the fire installations at Çatalhöyük provide insight into the food preparation, food consumption, and the social lives of the people who built and used them, nearly 9,000 years ago. How did people cook at Çatalhöyük? For my analysis of the fire installations, I will use multiple lines of evidence including the excavation data, spatial data, the data from the specialists working at Çatalhöyük, along with absorbed chemical residue, soil, and clay analyses on the archive samples of fire installations, to examine the foodstuffs cooked in the features, as well as their construction, material composition, and make-up. This past season, I was able to complete a large portion of the fieldwork necessary for this project and collect more than enough data to begin the analysis and write-up of my dissertation.

The bulk of my time at Çatalhöyük was dedicated to the procurement and exportation of fire installation floor samples for absorbed chemical residue, soil, and clay analyses. I exported nearly 200 sub-samples from archive samples of the floor make-up of ovens and hearths, to be analyzed with gas chromatography-mass spectrometry for absorbed chemical residue analysis of fatty acids along with soil and clay analyses (currently stored at Indiana University as quarantined foreign soils as per USDA regulations). Through these analyses, I hope to discover what sorts of plants and animal materials that were heated in the fire installations, the kinds of materials being used to construct the features, and the overall makeup of the fire installations. My sampling strategy for these sub-samples was rather simple, based on the existing archive samples, where possible I took a sub-sample from at least one floor unit per fire installation feature based on good context of the unit, viability of the sample, and availability of the sample. I focused my selection on floor surfaces to maintain consistency amongst ovens and hearths.

The remainder of my time was dedicated to data collection and collaboration with other researchers. I was able to witness the excavation of ten newly uncovered ovens and hearths. Particularly intriguing is the newly excavated oven cut into the wall of Building 77, which is larger and shaped much differently than any interior oven feature that I have yet to encounter; this outlier, in an already considerably strange building, potentially creates some insight into the activities and goings-on at the site. I procured the vast majority of the data that I will need for my dissertation analysis, including: excavation data, spatial data, specialist data, building and feature plans, and feature photographs. I began my preliminary analyses of each fire installation

in terms of the size, location, volume, and phase within a building. I developed, and began implementing, a typology to analyze the building materials of the fire installations (while relying greatly on previous work by Tung, Love, and Doherty). I will further explore their relationships to other features (particularly concurrent fire installations), the abandonment treatment, and associations with primary deposits.

I began a preliminary analysis of the late Neolithic and Chalcolithic potstands at Çatalhöyük in order to explore how cooking technologies change over time at the site. The potstands from Çatalhöyük have yet to be thoroughly studied, yet these lumpy, poorly fired, and generally not very impressive potstands provide evidence for the changing cooking traditions during the later Neolithic and Chalcolithic at Çatalhöyük. Future investigation and comprehensive analysis of these artifacts are necessary to explore the role of the potstands in the overall picture of cooking at Çatalhöyük; with the ultimate goal of placing the fire installations into a contextual understanding of daily life at Çatalhöyük.

This fieldwork was funded by a generous grant from the Edward A. Schrader Endowment Fund of the Program in Classical Archaeology at Indiana University, Bloomington, USA.

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25. Community Field Walking

Sophie Moore, Newcastle University

During August 2012, Sophie Moore was present at Çatalhöyük for 5 days to assess the feasibility of a larger survey targeted at locating the 'late' (that is, Roman, Byzantine and Islamic) settlement related to the cemetery which covers both the East and West mounds. Two days of field walking reconnaissance were conducted covering a distance of 58 km in two arcs around the mounds, one to the South-West and one running South-East to North-East. No material was collected, instead, sherd densities were counted along transects walked in fields which were either ploughed or where the wheat crop had already been harvested, leaving stubble. The majority of the fields were still under crop, however transects were walked in all of the available fields proximal to the two arcs.

The ceramic scatter identified South-West of the main site appeared to be entirely prehistoric, most likely relating to the Chaclolithic ceramic material on the West Mound, the location of two obsidian blades was also noted in this area. By contrast, in the arc to the South-East – North-East of the East mound two concentrations of ceramic sherds were located which probably date to the first and second millennium AD. The first of these areas was a path which leads south of the mound. This area showed a relatively high concentration of sherds, all courseware, including tegulae and imbrices which was recognisably the same fabric as the Roman and Byzantine tile familiar from the late cemetery. The second area was identified by Mustafa Tokyagsun, a site guard at Çatalhöyük and long term resident of the area. We asked Mustafa to take us to the location at which a heavily worn column capital (dating to the Late Antique or Byzantine period) was discovered. Mustafa drove us to a point North-East of the east mound (East 32°50'38.8, North 37°39'15.5). There was a shallow rise in the level of the dirt track at this point, and a substantial quantity of tile piled at the margins of the fields (Survey point/ photographs 007/8). A monochrome green glazed body sherd with a red fabric dating from the second millennium AD was also found in this area. The fields surrounding the rise in the road were cut away from the road level, with a drop of about half a metre from the surface of the road to the ground level of the field. Mustafa reported that the fields had been levelled in 1993 to aid irrigation. It is very possible, depending on the rate of alluvial deposition in the first and second millennium AD, that the levelling process removed what remained of the site which the sherd densities in the area suggest was present, it certainly will have caused significant disruption. The high concentration of first and second millennium AD ceramics to the east of the main site potentially indicates the location of settlements associated with the post-Chalcolithic cemetery which covers both mounds. There is potential for further work in collecting and analysing the ceramics to refine the suggested chronology and more firmly establish the limits of the settlement as well as walking the area later in the season when fewer of the fields would be under crop.

26. Çatalhöyük Archaeology Workshop, 2012

Gülay Sert

With the aim of introducing Çatalhöyük as a heritage site and the importance of the protection of such heritage places, the Çatalhöyük Archaeology Workshop took place every day between 10.00-15.00 o'clock, 6 days a week, from the 18th of June to the 19th of July 2012.

During this field season, similar to previous years, the workshop was presented to chidren and adults, in two separate programs. Most children participants were primary school students, while most adults were educators.

Childrens Education Program

A total of 298 primary school children joined the Summer School Workshop. The daylong workshops first introduced to the site to students with a presentation that informed them about the ancient life style. Then experimental house and excavation areas were visited. Afterwards, children would excavate the spoil from the 1960s excavations. Finally, they would have time to engage in some form of creative activity surrounding Neolithic life at Çatalhöyük. As children's attention was gained through the interactivity of the program, they became more sensitive the importance of heritage and archaeology.

Adult Education Program

Mostly primary school educators from Konya and public servants, this year, a total of 323 adults joined the program.

Further, the excavation team that works at Acem Höyük, Aksaray and Kubadabad by Gölkaya, Konya were invited to participate in the Çatalhöyük Archaeology Workshop. As mostly first-time visitors to the site, they were also able to visit the laboratories on site and gain further knowledge from the specialists working on site.

A similar program was followed as for the children but with more discussion of the problems faced by Çatalhöyük. It was seen that the guests had not come to Çatalhöyük before this program and they did not have any information about Çatalhöyük. Particular attention was given to promote the importance of Çatalhöyük as an important Neolithic site and its value to Turkey and the surrounding community as a World Heritage Site.

Although most of the visitors were from Konya, as observed in previous years, most of the participants had no prior knowledge of Çatalhöyük. The workshop aims to promote the study of Çatalhöyük within the classroom, and particular attention was given to educator participants in showing them ways of communicating the site in relation to the present. To this effect, a children's book, ***Çatalhöyük, The Leopard's Home*** written by Gülay Sert, the project coordinator, published by the Konya Architects Room for free, was distributed to public primary schools across Konya.

27. Trench 5-7 Pottery Archive Report 2012

Ingmar Franz, Freiburg University

The 2012 excavation season yielded more than 21 new pottery crates from Trench 5, but compared to the previous seasons only a small quantity of diagnostic pottery was sorted, weighed, counted, and labeled. So far more than 995 kg of pottery were processed which consist of more than 59 000 sherds (Table 27.1). The focus during the finds processing was on refitting, photographing and 3D-scanning of pottery vessels and so-called "potstands", because the main goal is to create beside a detailed photo-database also digital 3D-artifact models, which will be used for future analyses. The final object models shall be integrated in the online Çatalhöyük excavation database to allow an easy accessibility of this kind of realistic finds representation for other scholars. Additionally some huge units of the 2012 pottery and all the 2012 unfired pottery were examined to provide numerous information for the ongoing analyses of the manufacturing process of pottery. Like in previous years material samples were exported for archaeometric analyses in order to reconstruct the manufacturing process of pottery and to verify the preliminary interpretations presented in the last Archive Reports (Franz 2007-2011).

	weight in g	amount of sherds
undiag	535913	47894
diag	459580	11392
total	995493	59286

Table.27.1. Processed pottery from Trench 5-7 to date.

Raw Materials

While investigating the unfired pottery from 2012 and all the clay objects from Trench 5-7 found so far, some kneaded clay pieces were discovered of which some are burned. They show finger prints and are beside the clay balls another evidence for clay as raw material in the excavated room fills. In Space 449 in Building 98 directly under the exposed floor a second clay ball cache was found, which shows a continuing use of this part of the building for clay storage. In the neighboring Space 450 a base-sherd with standring covered in red pigment was discovered, which could be interpreted as a pigment tray (Figures 27.1 & 27.2).

Figure 27.2. Lumps of clay: 13740 (burned; Trench 5), 16982 (Space 450, Building 98), 17275 (burned; Space 342, Building 105); base-sherd with standring covered in red pigment: 16981 (Space 450, Building 98).

Figure 27.2. A second cache of unfired clay balls under the floor exposed in Space 449 in Building 98.

Tools made of bone, stone, and pottery sherds

Like the years before different kinds of tools made of bone, stone or pottery sherds were found in the room fills in Trench 5, of which some could be seen in connection to pottery production. Only the bone and pottery tools are presented here because the stone tools are analyzed and discussed by Jacob Brady. The most interesting four bone tools found in 2012 are an incised decorated and perforated bone fragment, a chisel-like tool with a bone hand-guard and a stone head, which is partly preserved in the hand-guard, a polished and worn perforated tablet, and an awl of the same type as the ones found in 2010 in Space 449 (Figure 27.3**;** Franz 2010). The pottery sherd tools can all be described as burnishers, because they all show abraded breaks. The different shapes of these burnishers give some idea of the different ways of use and the different states of use (Figure 27.4).

Figure 27.4. Different bone tools discovered 2012 in Trench 5: 17288/X.8, 18356/X.21 (Space 342, Building 105), 16997/X.26 (Space 342, Building 105), 16980/X.13 (Space 341, Building 98).

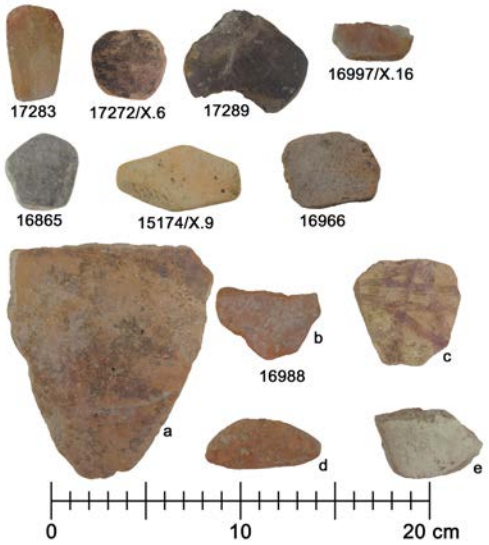

Figure 27.4. Burnishers made of pottery sherds, found in 2012: 17283 (Space 342, Building 105), 17272/X.6 (Space 342, Building 105), 17289 (Space 342, Building 105), 16997/X.16 (Space 342, Building 105), 16865 (Space 341, Building 98), 15174/X.9 (Space 345), 16966 (Space 342, Building 105), 16988 (Space 462, Building 107).

Unfired pottery

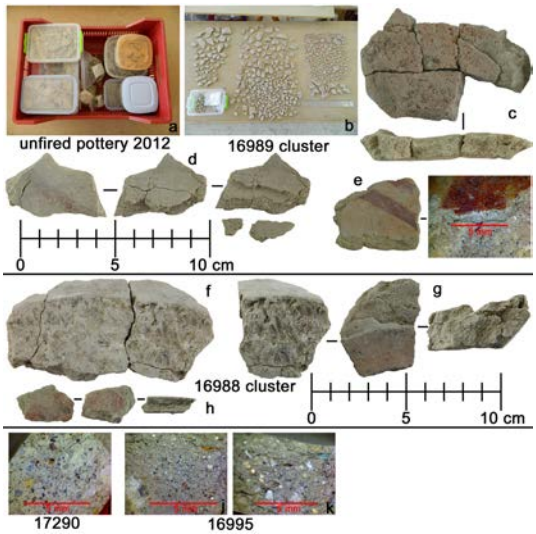

Figure 27.5. Unfired pottery 2012.

This year an extraordinary large quantity of unfired pottery fragments, often found in huge clusters of most likely bigger vessels parts, was found. Finally this excavation season revealed more than 8 kg of unfired pottery, salvaged in 14 units, compared to the previous years, which revealed only 7,5 kg in 68 units (Figure 27.5 a). The huge cluster of a painted vessel from Unit 16989 was found in Space 342 in Building 105, which shows fragments from the three main parts of this container, the rim-neck-part, the shoulder-belly-part and the base-part (Figure 27.5 b). The base was slightly concave and showed layers in the breaks, which indicates

the use of a mould for building up the lower vessel part with clay slabs (Figure 27.5 c). Some fragments of the cluster fell apart exactly at the joints of such clay slaps or layers and others seem to show a thick clay coating of the same material as the rest of the sherd (Figure 27.5 d & e). Another huge cluster from Unit 16988 was found in Space 462 in Building 107, which shows impressions of a coiled basket on the base and again clay layers in many breaks (Figure 27.5 f, h). The base fragments also show nicely the joints of the base slaps with the lowest body slaps of the vessel (Figure 27.5 g). As already known since last year there can be at least three clays be observed which were used for the pottery, a finer white-yellowish clay (Figure 27.5 i), a finer grayish clay (Figure 27.5 j) and a coarser grayish clay (Figure 27.5 k).

Pottery

Figure 27.6. Pottery 2012: Vessel 136, the missing link between the East and the West Mound pottery traditions.

One of the most important discoveries of the last years was made this season in Space 342 in Building 105 with Vessel 136. This dark-colored double-sided burnished restricted ellipsoid carinated bowl with S-profile, noblets and standring is a missing link between the East Mound and the West Mound pottery assemblages, because it combines elements of both traditions: the shape is typical for the West Mound pottery, but color, surface treatment, and fabric are typical for East Mound pottery. This is the first hybrid vessel found in good archaeological contexts at Çatalhöyük so far (Figure 27.6).

Beside this very special find 71 new vessels could be defined this season, which is a new record. Therewith, to date 190 vessels have been registered. A new vessel type discovered this season are “bottles” (Figure 27.7, Vessel 122: 16981 (Space 450, Building 98); Vessel 132: 16966 + 17259 + 17265 + 17272 + 17272/X.8 + 17274 + 17283 (Space 342, Building 105); Vessel 177: 16988/X.82 (Space 462, Building 107)), which show a very narrow-long neck compared to the necked-jars (Figure 27.7, Vessel 124: 16972/X.1 (Space 341, Building 98)). Additionally the first complete profile of a smaller cooking pot could be recorded with Vessel 143 (Figure 27.7, Vessel 143: 16966/X.39 (Space 342, Building 105)). With Vessel 180 another larger fragment of a bowl with a very thick white-yellowish deposit on the inner surface was recorded (Figure 27.7, Vessel 180: 17280/X.11 (Space 342, Building 105). Fragments of such vessels are common finds in the room fills of Trench 5, and such have been interpreted as bowls for boiling water. As the yellow color of this deposit is very striking other explanations should be taken into account. Maybe it is a phosphate rich guano-like deposit which accumulated during constant use of this bowl as a chamber pot. Ongoing material analyses will clarify these preliminary interpretations. After several years of lying in the finds depot at Çatalhöyük the fragmented Vessel 16, which was found together with other storage vessels on a floor in Trench 7 in 2007, could be refitted this season. Therefore the shape and size of the vessel is finally clear now (Figure 27.8, Vessel 16: 15104+15116 (Trench7)).

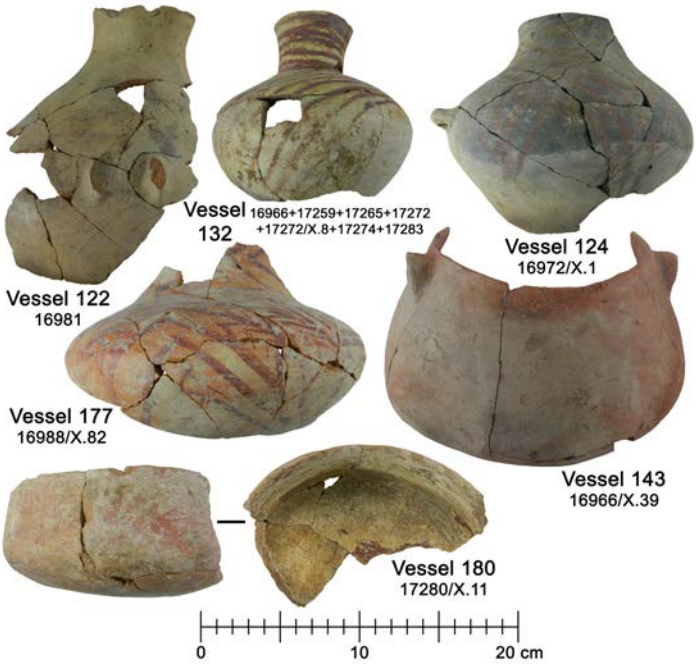

Figure 27.8. Pottery 2012, vessel spectrum part 1.

Figure 27.8. Pottery 2012, vessel spectrum part 2.

Additionally to 3D-laserscanning of vessels also the 3D-modelling of vessels based on digital photographs started this season. Although the final geometry of the artifact models created with this technique is not as detailed as the geometry of 3D-laserscan models, the 3D-modelling allows to register much more objects on site, because taking photos is faster than the scanning process, and the model textures are also much better. The 3D-modelling technique was successfully tested with pottery vessels, potstands, and a human skull (in collaboration with Scott Haddow) (Figure 27.9 3D-model of Vessel 29: 17208 (Space 310, Building 106); Figure 27.17 3D-model of potstand 17809/X.10 from TP Area).

Figure 27.9. Pottery 2012: 3D-model of Vessel 29.

Figure 27.10. Pottery 2012, vessel spectrum part 3.

Smaller pottery variants are shown in Figure 27.10. Here Vessel 154 (17272) from Space 342 in Building 105, which is a double-sided painted light-colored bowl with c-profile, is presented as an example for vessels made of a light-colored clay, which is also attested by unfired pottery (see above). Vessel 173 and Vessel 175 are examples for unusual bowl types. First is a double-sided painted ellipsoid bowl with \-profile and handles and second is a double-sided painted square bowl

with \-profile and feet (Figure 27.10, Vessel 173: 18356/X.12 (Space 342, Building 105); Vessel 175: 18356/X.36 (Space 342, Building 105)). Strictly speaking Vessel 147 and Vessel 142 are not vessels but a spoon and a lid, yet they are registered as "vessels" to ensure that they are treated with the same relevance as pottery vessels. Both finds are the best examples of such objects from Çatalhöyük so far (Figure 27.10, Vessel 147: 16966 (Space 342, Building 105); Vessel 142 17275/X.3 (Space 342, Building 105)).

Beside painted pottery also incised pottery is made at Çatalhöyük as shown in the 2011 Archive Report (Franz 2011). New examples of incised pottery, imported or locally made, are "Gelveri-like" pottery sherds from Unit 17268 from Trench 5, incised fragments from Unit 16980 in Space 341 in Building 98, and Vessel 176 from Building 105 (18370/X.1+18370/X.3+18370/X.8). Some pottery from Çatalhöyük West shows spiraloid elements in the decoration patterns, which is attested by the sherd of a painted necked jar from Unit 17235 from Trench 5, and the piece of an incised necked jar with horizontal handles from Space 342 in Building 105 (17265/X.1). Other extraordinary sherds are a double-sided painted boat-shaped carinated bowl with S-profile and I-beads on the points from Space 345 in Trench 5 (17287), and two pieces showing traces of repairs like perforations (17272: Space 342, Building 105) or white material which is following the breaks (16986: Space 454 & Space 461, Building 106) (Figure27.11).

Figure 27.11. Pottery 2012, miscellaneous finds.

But still the most striking decorations on pottery are figurative representations which are applied on Vessel 155, Vessel 128, Vessel 187, and most likely also on Vessel 159. Vessel 155 (16973+16980), a double sided-painted bowl with C-profile and human representation (woman), was found in Space 341 in Building 98. Vessel 128 (15180/X.16+16980+16981), a painted necked jar with internal lid support, S-profile and figurative representations (woman & most likely an animal), was found in Space 449 in Building 98. Vessel 187 (16988/X.10), a painted miniature necked jar with four horizontal handles and a scenic representation (man, "bird", "snakes", cattle, "river" or "road"), was found in Space 462 in Building 107. Vessel 159 (16988), a double-sided painted restricted bowl with C-profile and nose-like lugs, which look in combination with the painted decoration like a human face, was found in Space 462 in Building 107 (Figure 27.12).

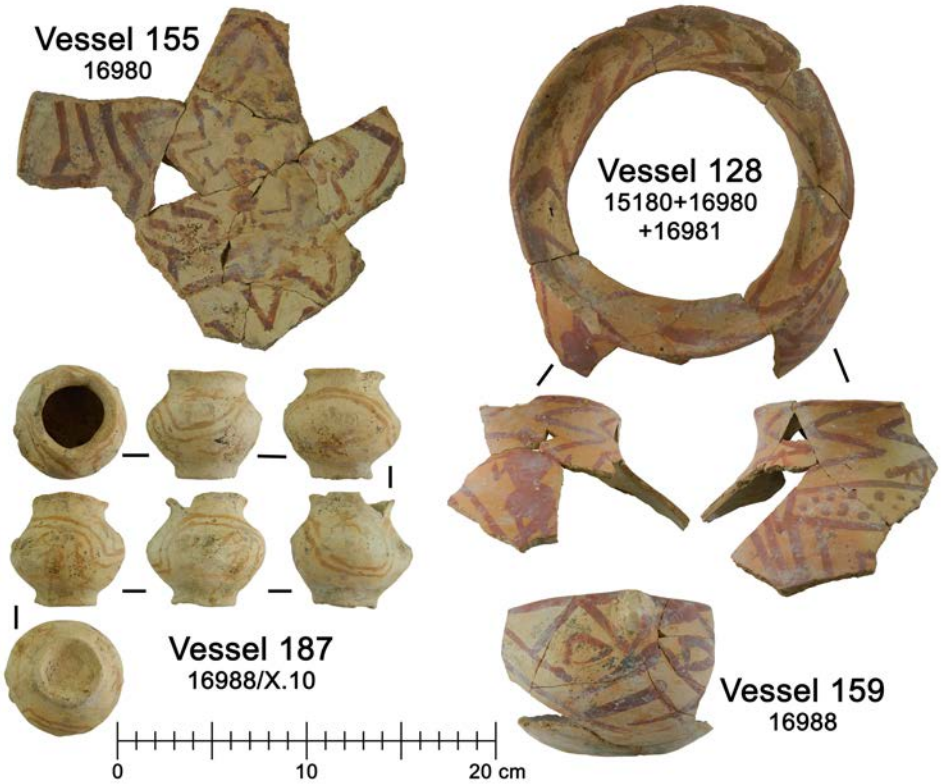

Figure 27.12. Pottery 2012, Çatalhöyük West figurative representations.

Potstands

One focus of the 2012 season was on refitting and photographing of so-called "potstands" which are interpreted as some kind of stands to put cooking pots directly over a flame or hot embers. They were found in Trench 5-7 from the beginning of the new excavations on the West Mound. Indeed such clay objects are known since the 1960's. (Mellaart 1965). With looking through the clay objects crates it became clear that beside the West Mound trenches also the TP Area and the TPC Area revealed some potstands, which shows that these devices have been in use in Çatalhöyük at least since the occupation phases excavated in these areas. Two main types can be distinguished: standing "horn-shaped" and lying "stool-shaped" potstands. The standing ones are dividable in single-horn and double-horn variants. The first often show a perforation in the main body or in some cases a handle on the backside. The front of the standing potstands is mostly fired and the back in many cases is very crumbly and sometimes dissolves in water as it is still unfired or low fired clay. It is clear that these clay objects were used with fire which hardened the objects while they were used. It seems very likely that the perforations and handles allowed a safe movement of the potstands with a stick in the hot embers or the fire. Many potstands are decorated with incised patterns which are similar to the patterns on the pottery. Standing perforated horn-shaped potstands are shown in Figure 27.13: 16898/X.15+17214/X.5 (Space 310, Building 106), 17225/X.7 (Trench 5), and 19301/X.2 (Trench 8). Standing double-horned potstands, lying stool-shaped potstands, and an unidentified clay object are presented in Figure 27.14: 17275/X.14 (Space 342, Building 105), 18365/X.4 (Trench 5), 15359/X.2 (Space 342, Building 105), 17263/X.17 (Space 342, Building 105), and the unidentified object 17214/X.9 (Space 310, Building 106). Standing horn-shaped potstands are shown in Figure 27.15: 15159/X.1 (Trench 5) with broken-off handle on the backside, and 17225 (Trench 5). Standing potstands from the TP and TPC Area are presented in Figure 27.16:

17809/X.10 a horn-shaped potstand from TP Area, and 20255/X.4 a double-horned potstand from TPC Area. Figure 27.17 shows the 3D-model of potstand 17809/X.10.

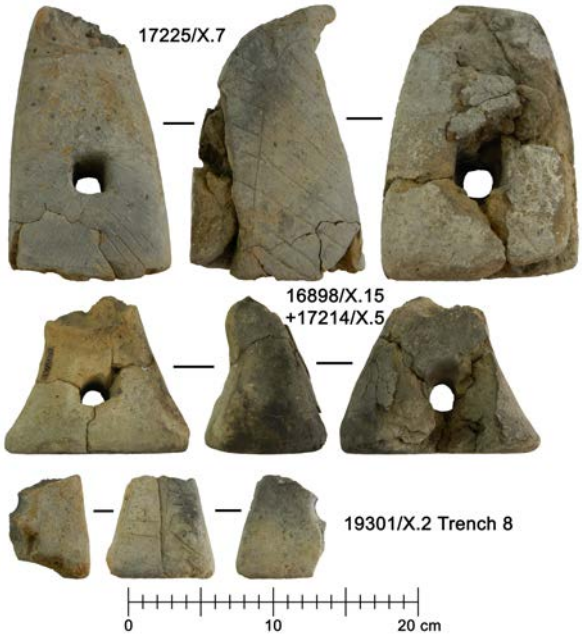

Figure 27.17. Çatalhöyük West 2012, potstands 1.

Figure 27.17. Çatalhöyük West 2012, potstands 2.

Figure 27.17. Çatalhöyük West 2012, potstands 3.

Figure 27.17. Çatalhöyük East 2012, potstands.

Figure 27.13. 3D-model of potstand 17809/X.10.

Miniatures – potstands and vessels

As more and more miniature vessels were found in Trench 5, it became clear that these objects could have played a significant role in daily life at Catalhöyük. Therefore clay object crates and the 2012 pottery from Trench 5 were checked to register as much as possible of them. Fortunately also the first miniature potstands were found this season in Trench 5 which also were registered. As miniature vessels and miniature potstands were made, and most likely also used together, this indicates, that their domestic use is simulated in small model variants, which could speak for their use as toys. As there is no standardized size detectable, and also the raw material and quality sometimes is very different, miniatures could also have been made by different skilled persons, and also for different purposes. So far double-horned potstands and one stool-shaped potstand, which look like made of typical dark "figurine" clay, could be registered: 17259/X.22 (Space 342, Building 105), 17263/X.13 (Space 342, Building 105), 18301 (Space 343, Building 107). The miniature vessels from Unit 15361 (Space 450, Building 98), 15194/X.4 (Space 446, Trench 5), and Vessel 129 (15562/X.4) found in Trench 8, are also made of "figurine" clay. In contrast the vessels from Unit 17268 (Trench 5), Unit 17265 (Space 342, Building 105), Vessel 188 (17272/X.32) from Space 342 in Building 105, and Vessel 187 (see above) are made of typical pottery clay, and are also of better quality as they are painted. One incised clay block from Unit 16990 (Trench 5) shows parts of a most likely figurative decoration, which could originally have shown a human face (Figure 27.18).

Figure 27.18. Miniatures 2012.

Material samples and analyses

Since 2010 different kinds of material samples were exported for archaeometric analyses. Preliminary results of IR-spectroscopic analyses were presented in the 2011 Archive Report and meanwhile are published in a paper (Franz 2011, Franz & Ostaptchouk 2012). This season 49 samples of pottery, unfired pottery, clay and potstands were exported, which rises the total sample number to 165. The following Table 2 shows the number of different material samples exported from 2010-2012. Preliminary IR-spectroscopic analyses of clay from clay balls and potstands in comparison with pottery and unfired pottery indicate, that a very similar clay mixture was indeed used for all the objects. Additionally to the IR-spectroscopic analyses petrographic thin section analyses are in preparation.

material	**year**			**total**
	2010	**2011**	**2012**	
pottery	27	51	28	**106**
unfired pottery	10	5	7	**22**
clay	-	1	5	**6**
pigment	15	1	-	**16**
potstand	-	-	9	**9**
slag	3	3	-	**6**
total	**55**	**61**	**49**	**165**

Table 27.2 Exported material samples from 2010-2012.

Acknowledgments

I want to thank Sonia Ostaptchouk (IR-Spectroscopy), Patrick Willett (3D-scanning), Scott Haddow (3D-modelling of human skull), all the West Mound Buffalo-Berlin-Team, Ashley Lingle and her helpers (refitting and conservation of vessels), Duygu Tarkan Özbudak (East Mound pottery), and Banu Aydınoğlugil for their help and discussions.

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28. Site Visualisation and Presentation 2012

Sara Perry (University of York), Angeliki Chrysanthi (University of Southampton) and Stephanie Moser (University of Southampton), with contributions from Ian Kirkpatrick, Emily Richardson, Harish Sharma, Sam Ainsworth and Jack Baigent (all University of Southampton), and Gamze Meşe (Ege University)

The 2012 field season marks our team's fourth year of work at Çatalhöyük, and as per previous years, we have continued to expand our methodology and outputs related to public presentation, visitor studies and critical visual research. We arrived with a larger group than ever before (Stephanie Moser, Sara Perry, Ian Kirkpatrick, Graeme Earl, Angeliki Chrysanthi, Harish Sharma, Emily Richardson, Sam Ainsworth, Jack Baigent), including five undergraduate students who were key contributors to the planning, design and implementation of our visualisation projects and who assisted in some excavation and post-excavation activities with the wider Çatalhöyük team. Amongst the students, we had our first full-time Turkish collaborator dedicated specifically to visualisation work: Gamze Meşe, a fourth-year tourism undergraduate at Ege University. This collaboration was productive not only in terms of cultural exchange, but so too in terms of furthering the interdisciplinary nature of our approach, as we aimed to share, critique and develop ideas through the simultaneous lenses of tourism, heritage and archaeology.

Yıldız Dirmit, a long-time contributor to our team, also travelled down from Ankara to join us for a day of work, and we had a special visit from Emily Arauz (ceramics illustrator at Alalakh and PhD student at Koc University) over the course of our time on site, as well as from Ozlem Aslan (undergraduate student at Istanbul Technical University). Our work depends upon the intellectual and physical energy of these many participants, and our evaluations suggest that it is in this cross-over of people and approaches that we are crafting a modest, but uniquely creative, responsive and iterative practice at Çatalhöyük. We continue to be committed to affordable, sustainable and rigorously-assessed outputs developed through long-term observation and testing. Similarly, we prioritise the pedagogical nature of our work which enables students (locally and internationally) to come together in the research and design of a range of heritage products and methods, and to then participate in their critique and rethinking.

Visitor and Site Staff Research: Interviews and Critical Feedback

Since 2009, our point of departure for new work has been the collection of impressions and criticisms from incoming visitors and long-time site staff. This year our team was joined by Angeliki Chrysanthi who considerably extended this methodology both in the Visitor's Centre itself and on site. Angeliki's multi-sited international research has two components—one described elsewhere in this report using Looxcie devices in concert with the West Mount team's excavators—and another focussed on understanding visitors' movements through the landscape at Çatalhöyük.

Our studies to date have included semi-structured interviews and observations with visitors and site staff. In other words, we would introduce ourselves to visitors upon their entry into the Visitor's Centre, and ask for their permission both to accompany them on their site tour (led by a site guard) and to speak to them afterwards about their experiences. Every year, upon arrival, we have also sat down with the site guards to gather their thoughts on our previous year's work, as well as their recommendations for the future. With the addition of Angeliki to the team,

however, our typical methodology has been elaborated to include written questionnaires as well as GPS-surveying of visitors' movements and their viewing points around the site (see next section for further detail).

In terms of site guard interviews, Yıldız and Gamze sat in conversation with Hasan and İbrahim to discuss numbers of visitors, satisfaction with previous changes to the Visitor Centre, comments on current plans for additions to the Centre, distribution of and payment for brochures and guidebooks, and ordering of reprints. Their feedback is incorporated into various sections of this report, but with regards to attendance, over the course of 2011, they counted approximately 14,800 visitors. For 2012, up until the month of July, the total number was estimated at 6,900. The guards hypothesised that visits tend to correlate with media coverage of the site. There was some speculation, too, that the newly-awarded UNESCO World Heritage status of the site has had a minor impact on numbers so far.

As regards our team's modifications to the Visitor Centre, according to the guards, tour guides who visit the site with their groups are happy with the changes that we have implemented at the site since 2009. Our plans for this season (see details below) were generally well-received by the guards, with the exception of our proposal for a children's space, where young visitors could occupy themselves whilst their parents tour the Centre. This is an ongoing point of debate between our team and the guards, as the Centre in its current state is not appropriate for younger people, neither in terms of visual/interactive displays nor text. As per previous team reports, we have aimed to address this problem via addition (in 2010 and 2011) of paintings in the alcoves, and in 2011, the design and printing of a children's brochure. Again this year, our students identified a need for further attention to young audiences, but the guards continued to express concern about dedicating space to such audiences because, during the off-season, children tend to visit in groups of 50 as part of school trips. The guards felt that the Children's area would be overwhelmed, and thus they proposed an alternative: 2-3 exclusive children's panels with simpler language and more engaging – especially humorous – content. Below we describe how we have incorporated this feedback into a new display focused on Çatalhöyük's figurines.

Taken together, preliminary review of all the data suggests that whilst visitors, site guards and site staff are generally satisfied with their experience of Çatalhöyük, for the most part they would prefer more information—and more up-to-date information—on the archaeology delivered through on-site signage, site guides, artefactual displays, replicas of the wall paintings and reliefs, photos and other images, and physical reconstructions of the houses. As described below, these are matters that we attempt to address every year at Çatalhöyük whilst negotiating a tight budget, small team size, the impossibility of working on-site for more than three weeks at the end of each season (due to limited lodging), and an intellectual approach that privileges small-scale, iterative redesign and testing above sweeping, permanent change.

On-site Visitor Survey for Informing Interpretive Planning

In order to inform the broader visitor management plan and the on-site presentation of Çatalhöyük this season, as mentioned above, we enriched our visitor surveys with new methodological tools. We employed a variety of digital and analogue media to collect data on visitors' views of the site. The methodology has been developed by Angeliki Chrysanthi as part of her PhD Research and it is currently being tested at a variety of sites to validate its effectiveness.

This methodology was created as a response to relatively recent theoretical approaches concerning the importance of the 'visitor perception' factor in planning for interpretation and the dilemma about whether to engage in qualitative or quantitative research in order to explore this factor in heritage site management. Different opinions on the matter have led researchers to adopt a variety of techniques in evaluating visitors' interactions with heritage spaces, but mixed-method approaches that integrate both qualitative and quantitative methods are suggested in order to validate experiential and observed findings.

(1) Description of data collection

(a) Observations and questionnaires

The first data collection method included a variety of qualitative methodologies such as observations and questionnaires used traditionally in ethnomethodological studies. For conducting observations around visitor-site interaction we followed a commonly-used technique in such contexts called 'shadowing'. With their knowledge, our team members followed visitors throughout their guided tour and recorded their interaction with the site via pen-and-paper as well as cameras. At the end of their tour, visitors were asked to fill in a purpose-designed questionnaire which was available in English and Turkish (translated by Yıldız, with assistance from Gamze). Apart from the structured questions which include demographics, the questionnaire was designed to allow people to express their opinion on what they valued the most during their visit or disliked the most about the archaeological site. In total, fourteen visitors took part in this first survey and provided their assessment and views on 4 basic domains:

1. On-site accessibility
2. Perception and awareness of the site's layout as they walked around; the ease or difficulty of identifying the archaeological remains
3. Aesthetics of the site (e.g., they had the opportunity to assess state of preservation, conservation and maintenance of the site)
4. Existing interpretative infrastructure and what more they would like to see in future designs

(b) Spatiotemporal and image data collection

In parallel to observations and questionnaires, tracking and recording technologies such as GPS body tracking and camera recordings were employed. Each visitor was asked to carry a small lightweight wearable GPS device that was usually hung around the neck or placed in a pocket. Additionally, visitors were given a synchronised digital camera and were instructed to take pictures during the visit, as they would normally do with their own camera. There were certain cases where the visitor wanted to use his/her own camera, which meant that we had to synchronise it with the respective GPS device to ensure accuracy in our data. This methodology aimed at the collection of high resolution data about where people engage with the archaeological site and what part or aspect of the site attracted their attention the most. Also, it was generally perceived as a relatively unobtrusive method of acquiring location-based information about visitor-site interaction since the visitor was not required to perform any actions unusual to the standard visiting routine. Thus, the data obtained via this method were arguably more representative than 'shadowing' or the questionnaires where the visitor was aware or reminded of being recorded and interviewed. In all cases, visitors were given the option of supplying us with their email addresses such that we could contact them after the field season to update them on our work and provide them with their image files to add to their personal photo collections.

(2) Future Work

Our plan is to continue collecting both qualitative and quantitative data from visitors and their experience on-site during season 2013 in order to proceed to a stage of data analysis and interpretation.

The data gathered from the observations and the free form questions included in the questionnaire will be examined in order to identify recurring themes about visitors' interactions with the site. Additionally, the responses from the structured questions are being digitised and organised in a spreadsheet in order to go through standard statistical analysis as soon as the sample gathered is sufficient to obtain statistically-sound results. The first responses to the format of the questionnaire showed that it is a bit too long and although it does not take more than eight minutes to fill in as such, we plan to reduce it in order to facilitate the survey.

In terms of handling the spatiotemporal and image data four stages are anticipated:

1. Geotagging image data: through this process the image data obtain location information which is an essential attribute for the next stage of analysis.
2. Conducting a Hot Spot analysis with Rendering in ArcGIS: this analysis utilises a number of geoprocessing tools to aggregate and integrate points representing the locations of images captured by visitors. The analysis generates unique locations - the 'hotspots' - which represent weighted clusters of image data. The results are visualised according to the ICOUNT field, the sum of all incidents – in this case the images captured - at each location. Considering that people take photographs of instances or the things they want to remember from their visit, this experiment reveals the hotspots of the site as visitors assessed them. Further to this, and in order to identify recurring patterns and themes in the data, a thematic analysis for each hotspot will be conducted.
3. Conducting a density analysis in ArcGIS of the GPS tracks: this analysis provides a better insight on the patterns of visitor movement within the site. In the case of Çatalhöyük, little variation on visitor movement is expected due to the guided tours. Nevertheless, getting an overview of how this is usually being conducted is a valuable component for informing future planning of the interpretive walks. Further time-space analysis of the GPS data will allow us to understand where visitors pause to engage with the archaeological remains, the information provided on-site and in conversations with the guide or between members of their group.
4. Finally, a cross examination of the data and the results from the different methodologies will enable a complementary approach to the dataset and allow the triangulation of the findings.

Site Guidebook & Brochure

At the end of our 2011 season, our team completed and printed an initial run of 2000 English-language Çatalhöyük guidebooks. At the same time, the Turkish version of the guidebook was sent out for revision and translation by Banu and Serap, and the final Turkish text was submitted to us in advance of our return to site in 2012. The text has now to be inserted into the final design before a print run can be completed. This task is among the tasks set for 2013.

Encouragingly, the site guards estimate that approximately 200-300 English guidebooks were sold over the 2011-12 year and a cost of about 5TL. Of a total of 15,000 visitors during the same time frame, c. 3000-3500 of these were foreign, suggesting that up to 1 in every 5 such visitors

might have purchased a guidebook. This is a valuable funding stream for the Centre, not only because the money was reinvested this year into a new DVD and TV player, but because it has effectively provided us with a sustainable source of income to continue aspects of our practice at Çatalhöyük (see below for further commentary on financing our work).

In 2010 we completed a bi-lingual (Turkish-English), one-sheet, two-fold brochure, of which 5000 copies were then printed at a local Konya print centre. The week before our arrival this year, the last of that 5000-copy print run was distributed to visitors. The guards indicated that upwards of one-third of visitors throw these brochures away before leaving Çatalhöyük – sometimes, unfortunately, littering the site in the process. However, the other two-thirds of visitors seem to take the brochures away with them as souvenirs, and as such, they are generally perceived to be a successful addition to the site's outputs.

We continue to struggle with lack of funding for our graphic design work such that we could not prioritise reprinting of the brochures nor completion of the Turkish-language guidebook this year. Our graphic designer is volunteering his time to the project, which is an unsustainable predicament, particularly as we may not be able to even fund his travel to the site in the future. The proceeds of the guidebook sales are insufficient to support this work, and we continue to seek sources of funding and ideas to help further Ian K.'s practice in the upcoming years. We have gathered adequate testimony to the efficacy and impact of our approach, and accordingly, we are keen to see it recognised as a key and necessary aspect of Çatalhöyük's portfolio.

Visitor's Centre

We continue to apply an approach in the Visitor's Centre that prioritises a reflexive form of practice routed in affordable, evidence-based, easily-modifiable design strategies. Whilst this practice was originally born out of necessity (owing to a lack of sustainable funding), it has evolved into a meaningful pedagogical and intellectual exercise with bigger implications for overall museological studies. As a process, it entails us arriving on site each year and assessing the effectiveness of our previous year's additions to the Centre (via semi-structured interviews and informal conversations recorded via pen-and-paper (see details above)). The students then conduct their own evaluations of the extant displays both in the Centre itself and across the larger site, and data from both sets of evaluations are then drawn together into recommendations for new modifications to Çatalhöyük's exhibitions. The students review previous reports and records from our team's database, and propose very specific projects achievable on a negligible budget in a 1.5 week timeframe, with materials sourceable from the local community. An active investment is made into critical reflection and self-reflection, and we purposefully design the displays to be temporary and modifiable knowing that problems, changing interpretations, and new finds will always affect presentation. As per below, our experiences in constructing one particular exhibit – the Figurine Stand – speak to the advantages – theoretical, educational, and methodological – of this non-permanent, mutable approach.

In total, our work in the Centre this year cost c. 550 TL, including a major run of hanging display boards, with all materials sourced in Konya.

Entrance Hall

As per our 2011 report, we have long planned to revamp features of the Visitor's Centre entranceway, as it has been populated by a series of stray photographs, posters and sponsor

signs that lack consistency in terms of narrative and aesthetic. Last year, Ian K. and Kelly du Rand mocked up a design for the space, using the photography of Jason Quinlan and Scott Haddow to offer an evocative introduction to the site's exhibition. Due to lack of time and funds, we decided to postpone implementation of the project until 2012, which had the benefit of offering more opportunity for critical reflection on and elaboration of the design. Upon arriving on site this year, Emily Richardson and Harish Sharma expressed interest in following up on the project, and proceeded to review our 2011 plans as well as conduct another full search of Çatalhöyük's image databases for relevant photos. Informed by discussions with Jason and Scott, Emily and Harish opted to modify the original blueprint for the space (which entailed replacing existing displays only on the east wall of the entrance), adding different and more imagery to both the east and west corridor walls—10 photographs in total, one shot by Emily and Harish themselves, all atmospheric in character, speaking to the landscape, people and overall ambience of the site.

In addition to the hanging images, we have been interested to produce a formal 'Welcome to Çatalhöyük' sign to brand the guards' desk and offer a clear introductory salutation to visitors. Currently there is no such signage, and the desk itself is marked only by stains and scars from years of use and wear. We hence designed and printed a simple greeting sign, which covers a portion of the front face of the desk and which ties the look of the site guidebook and brochure into the emerging aesthetic of the Visitor's Centre. We are hopeful that, together, the redesigned entrance hall will offer visitors a more clear and evocative introduction to the site itself.

Excavation History

Since 2009 we have slowly begun to dismantle and replace aspects of the primary displays in the Visitor's Centre. As above, the aim has been to update and give more visual and narrative coherence to the exhibitions whilst experimenting with a low-budget, non-permanent method driven by the students and led by input from the various communities who engage with and work at the site. In 2011, we made the first major changes to the Centre's display boards via installation of the *Legacy of Çatalhöyük* exhibit. That exhibit was affixed to hanging fabric panels, and its success (measured via this year's qualitative evaluations) has suggested that we might productively continue along the same vein, using the fabric as a means to divide up and add dimension to the internal space of the Visitor's Centre, absorb noise, and provide an easily-alterable façade upon which to trial new approaches in the future. The reverse side of one of the *Legacy* hanging panels was left blank last year with the intention of developing it during our next field season; thus upon returning to the site this summer, our team set upon mocking up content to populate it.

Research conducted since 2009 has indicated that Visitor's Centre audiences are keen for more information on both the history of excavations and the artefacts uncovered at Çatalhöyük. Incorporating recommendations from our site-feedback analyses this season, Jack Baigent and Sam Ainsworth, with the design support of Ian K., crafted a display which charts the major finds at the site through time from the Mellaart team's excavations in the 1960s up to the most recent season. The narrative was purposely designed to unite text with a range of photographic and illustrative media produced by Çatalhöyük's various specialists, and the replaceable nature of the printed boards hung on the fabric panels means that we can modify the exhibit over time as new materials are uncovered and interpretations of the archaeological record evolve.

In addition and on the wall adjacent to the *Excavation History* exhibit, our team began to plan for a display which would showcase the breadth of international involvement at Çatalhöyük. This plan was born out of survey data suggesting that visitors often query the number of non-Turkish nationals who contribute to the overall Çatalhöyük Research Project. Our aim was to replace an out-dated and overly-complex extant relief map of the excavations (on the east wall of the Visitor's Centre, directly begin the *Legacy of Çatalhöyük* exhibit) with a world map which pinpointed the origins of different specialist teams, and hinted at the productivity of such a global cooperative research effort. Due to time limitations, the graphics for this display could not be realised before the end of the season, but all relevant textual information is stored on the site database for possible use in forthcoming seasons.

Images of Çatalhöyük Portfolio

In 2011 our team crafted and installed a small, table-top portfolio to showcase illustrations and digital imagery created by Çatalhöyük's various visual media specialists in recent years. Whilst these specialists produce a wealth of outputs every season, such outputs are often never seen by visitors owing to their specificity and design for particular publication or research purposes. The nature of the portfolio allows it to be added to and rearranged over time, and Sam Ainsworth – with graphic support from Ian K. – took the lead this season in continuing to elaborate its content. After scanning available materials, a range of images was incorporated into the display by Kathryn Killackey, Mesa Schumacher, and Patrick Willett, together testifying to the various forms of visual production (e.g., illustrative reconstruction, three-dimensional scanning) applied across Çatalhöyük's East and West Mounds. The advantage of this portfolio is its potential not only to highlight innovative visual media work at the site, but to speak to the evolution of archaeological interpretation, as the cumulative nature of the imagery maps changes in thinking about Çatalhöyük and presenting it over time. This is one of the few forms of exhibition in the Visitor's Centre that gets at the unstable, always-emergent nature of the archaeological process, and that explicitly seeks to accentuate the multiple, sometimes-conflicting ideas that make up the site's record.

Figurine Stand

Based on our evaluations, we have had a long-standing interest in refining some of the Mother Goddess-focussed exhibitionary materials in the Visitor's Centre. These include an antiquated free-standing panel in the middle of the Centre and a printed panel on the north wall of the Centre, both inconsistent and obsolete in their content and aesthetic. Our previous work has aimed at creating more of a child-friendly space in the northwest and southwest corners of the room (via painting of the alcoves and addition of explanatory captions), such that by removing the free-standing Mother Goddess panel we could open up further capacity for such youth-oriented displays. Led by Emily Richardson and Harish Sharma, and following the model of the *Images of Çatalhöyük* portfolio, a plan was conceived to construct a stand (out of recycled materials) displaying an illustrated booklet and child-friendly picture 'flashcards' on the more general subject of Neolithic figurines. The booklet was intended to appeal to a variety of audiences, providing background (textual and visual) on the nature and evolving archaeological interpretations of figurines; whilst the flashcards were envisioned as primarily image-based, affixed to cordage that could be reached, viewed, handled and easily-digested by very young visitors.

The content of the booklet and flashcards was researched by Emily and Harish using a series of articles by Çatalhöyük's researchers (Meskell, Nakamura, King, Shahid, Hodder) housed in the Çatalhöyük library. The complex character of this scholarship meant that the project was complicated from the outset, particularly owing to the long history of changing interpretations of figurine representation and use at Çatalhöyük and beyond. The text for the booklet was circulated to various members of the wider team for review approximately one week before it was scheduled for translation, but for multiple reasons critical commentary did not come back to us until the day before printing. We drastically edited the content and translated the document in a tight timeframe, however further critique came back in the moments before sending the exhibit to print.

As the Visitor's Centre is a place of—foremost—teaching and learning, we made the decision to send the documents to the printers knowing that next season we would revise and add to it. This is the pedagogical model that we have followed since 2009, and it has allowed students and other audiences to witness how critique and judicious reflection shape redesign of our outputs. It is linked to a reflexive form of learning and creative development, wherein simultaneous with generating new content each season, we revisit and remodel old content in an iterative, self-conscious, evolving way. We believe that this model of production echoes the reflexive form of archaeological practice that typifies the larger Çatalhöyük research paradigm, and as such it would have been spurious to dispense with the figurine project at the last moment (when it had already been designed and budgeted for) owing to critical—but not insurmountable—feedback. The modifiable display strategy that we have adopted here also ensures that we can easily replace and build upon the existing content in future years—incorporating new flashcards and new pages into the booklet.

New Signage

Based on data gathered since 2010, we have been adding small sections of text to areas in the Visitor's Centre which have generated uncertainty or which lack sufficient context. Amongst the challenges of working in the Centre is our inability to display original artefactual material on site owing to long-standing arrangements with the Konya Archaeological Museum and, before that, the Museum of Anatolian Civilisations in Ankara. This predicament is one that causes confusion and dismay amongst visitors, and is rendered more problematic by the series of replica artefacts exhibited in recesses along the west wall of the Centre which are not identified as reconstructions. In light of such issues, we have created signage to clarify the whereabouts of the original artefacts and demarcate the displayed items as copies. Given constraints around the housing and exhibition of Çatalhöyük's material remains, the task of adding materiality to the Visitor's Centre and increasing physical engagement with the existing presentations continues to be a priority of our team.

After leaving the site in 2011, we also learned that the new site guidebook was effectively invisible to visitors, as no display stands or publicity were available to give presence to the product. Seemingly from its initial opening in the 1990s, the Visitor's Centre has lodged a large exhibition table that has been repurposed multiple times for different expositions. Since 2009, that table has served little function beyond holding the Visitor Comment Book, and whilst there are various possibilities for using these furnishings to greater effect (especially considering how few material components are at hand in the Centre), for now we have appropriated it to draw attention to the guidebooks, and produced accompanying promotional signage. Whether these books will be restocked on the table is unclear, as (despite best efforts and our focus on

sustainable methodologies) we have historically had troubles maintaining some of the team's work after our departure from site.

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