

# ÇATALHÖYÜK 2013 ARCHIVE REPORT

## ÇATALHÖYÜK RESEARCH PROJECT



Compiled by Burcu Tung

Cover: The wall painting found within B.121. Photography Jason Quinlan



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## **1. 2013 Season Review**

Ian Hodder, Stanford University

After the euphoria of the UNESCO inscription of Çatalhöyük onto the World Heritage list in 2012, we seemed to be living through a severe headache in the 2013 season. In many ways the impact of the inscription was very positive. The guards at the site count the number of foreign and Turkish visitors every day. Since January 2013 the numbers of visitors increased dramatically. Bus loads arrived daily during the 2013 season, brought by companies advertising themselves with names like 'World Heritage Academy'. Clearly UNESCO inscription has made a big difference and local and regional communities will benefit. Inscription has also meant the site has attracted greater investment by national and regional heritage organizations. For example, MEVKA (Mevlana Kalkınma Ajansı / Mevlana Development Agency) has provided funding for four new experimental houses that will themselves attract more tourists when they are constructed next year. On the other hand, the increasing numbers of tourists create their own headaches, putting pressure on the parking facilities and causing faster erosion on the paths across the mound. But the greatest impact has to do with regulation regarding health and safety. For example, Stanford University has become concerned about its liability in relation to the tourist numbers and has requested 50 improvements – everything from wooden caps on survey pegs to better medical training for staff.

Luckily we have had a wonderful new management team wending its ways between the increasing demands of bureaucracies and administrations. Yıldız Dirmit has taken over as a very effective project manager, supported in the field by the wisdom of Levent Özer and by the help of our Assistant Director Serap Özdöl. Our temsilci was Fahri Ayçin from Konya museum.

Luckily too the archaeology has been very rewarding and we made a number of remarkable new finds. These kept the team in good form, even when our numbers got up to 120, from 22 different countries. Çatalhöyük 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 roof tops 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. Because Çatalhöyük is a large site (13.5 ha) at an early date and with good preservation, its excavation is slow and difficult: it needs a big team.

This season excavations were conducted in the North and South Shelters, in the TPC area, within two small test trenches in the northern skirt of the East mound, and finally within Trench 5 in the West Mound (Fig. 1.1).



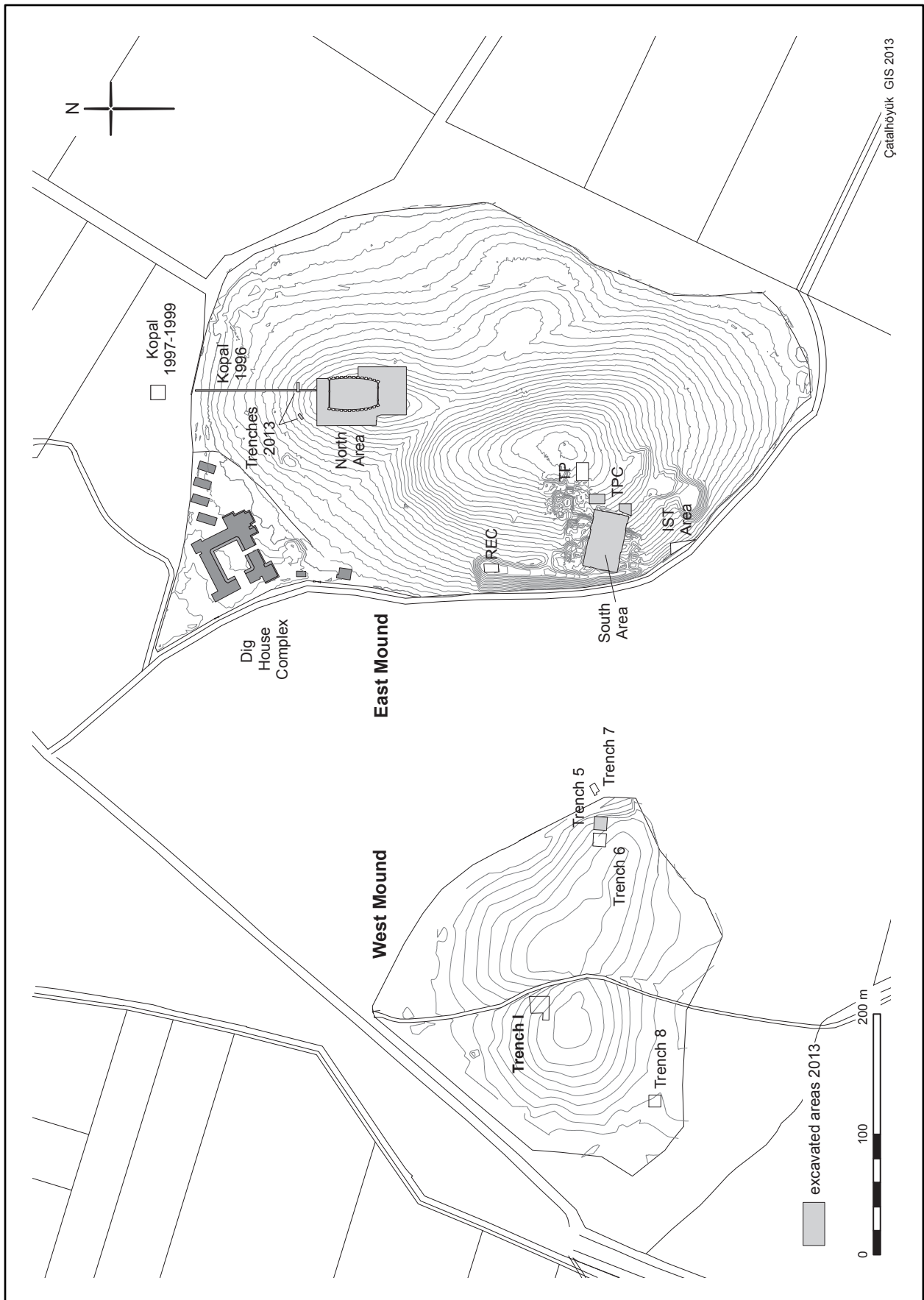


Fig. 1.1. Areas of investigation conducted by the Çatalhöyük Research Project in 2013. Plan: Camilla Mazzucato



Figure 1.2. Neolithic linen preserved in a burial in Building 52. Photography: Jason Quinlan.

It is the good preservation at the site that led to the most remarkable of our discoveries in 2013. Building 52 in the North shelter had been burned by its Neolithic inhabitants when it was abandoned. This conflagration had baked through the floors and platforms of the building; in doing so it had inadvertently preserved cloth that had been placed



Figure 1.3. Wooden bowl placed on the skull in a burial in Building 52. Photography: Jason Quinlan

between the skeletons of those buried beneath the floors. This cloth (Fig. 1.2) has been analysed at the laboratories at Çatalhöyük and it has been identified as linen, made from flax. This is one of the earliest finds of cloth in the world, and is certainly one of the best preserved. It seems that the linen, which is very finely woven, was traded from the Levant all the way to central Anatolia. Archaeologists have long known of the long-distance trade of obsidian and shells at this time period in the Middle East, but this is the first indication that cloth or textile may have been part of the trade, perhaps exchanged for the obsidian from Cappadocia.

In the same grave a wooden bowl or some sort of head cover made of wood was placed over the skull of a child (Fig. 1.3). The dead at Çatalhöyük were sometimes treated in very different and remarkable ways. Over the years we have found many unusual burials, such as bodies buried with a lamb, or covered in the scat of a small carnivore, or quite frequently with the head removed. It is tempting to interpret the wooden head cover as a mask, since the latter have been found in the Neolithic of the Levant, but in this case the most likely explanation is that the decayed wooden object is a bowl.





Figure 1.4. Wild sheep horns arranged along a thin 'bench' in Building 52. Photography: Jason Quinlan.

Both the cloth and wooden bowl were found in graves in the north part of the main room in Building 52 in the North Area of the site. This building had in previous excavation seasons proved to be very interesting and unusual, with a bull's skull and horns set into the west wall and with a bench with bull horns affixed to its side. It was obviously an especially large and complex building. In most buildings, installations such as bull horns on

walls were removed when the building was abandoned. But Building 52 was burned, and we often find that burned buildings retained their installations. So it is difficult to work out whether some buildings like Building 52 look more elaborate because of the way they were abandoned, or whether they were burned on abandonment because they were special and elaborate – a classic chicken-and-egg problem. One possible indication that Building 52 had long been special and important was that when in 2013 we dismantled the bench that had held bull horns, we discovered a thinner smaller bench beneath it, this time affixed with wild sheep horns (Fig. 1.4). It seems increasingly likely that more important buildings were abandoned by intentional burnings.

In 2013 we also started excavating Neolithic buildings in an area we are calling TPC in the southern part of the site. The aim here is to understand how the site changed in its latest phases of occupation and to link up some of our previously separated excavation areas (TP and South). Here we found buildings that indeed did differ very much from earlier buildings (with, for example very thick walls built with large flat bricks) and which had not been burned on abandonment. One of the buildings at this late phase had walls painted with designs not seen before (see cover). Normally the paintings at Çatalhöyük are made using dark paint (red or black mostly) on a white background, but in this case very regular white lines had been painted on a darker background. This painting continued along at least the east and north walls of the main room: it must have been a very bright and vibrant space.

Normally archaeologists record everything, including wall paintings, using paper and pencil and photography. Indeed, archaeological recording has become increasingly a matter of filling in forms and drawing plans on permatrace. This is slow and laborious and afterwards, back in the dig house, all the data have to be entered into the database, the plans scanned and digitized and the



photographs uploaded. In 2013 we started making use of new digital technologies to speed up this process and make it more flexible. Using computer tablets (Fig. 1.5), images are taken of what is being excavated and these images are converted into 3D models that can be orthogonally rectified and placed into the GIS database for the site. Still in the trench, the excavated features or skeletons can be drawn over and annotated and uploaded as shape files into the GIS. So all the planning and recording can be done without paper. This system was used successfully in 2013 in a few excavation areas; we hope to expand the use of tablets across the whole site next year.

For many years, teams have also been working on the Chalcolithic West Mound at Çatalhöyük. In 2013 the trenches there were finally filled in and closed down. So this was the last year of excavations by the team led by Peter Biehl, Eva Rosenstock and Jana Rogasch. Members of the team will be returning to work on post-excavation, but we are sorry to see them leave the field. Much has been accomplished and we now have for the first time a good picture of how the Çatalhöyük community changed as it moved into the 6<sup>th</sup> millennium BCE.



Figure 1.5. Justine Issavi (left) and Katarzyna Harabasz (right) recording using a tablet in Building 80. Photography: Jason Quinlan

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Eastern Technical University, Ege University, SUNY Buffalo, Duke University, Cardiff University, and Newcastle University

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## **2. Excavations in the North Area, 2013**

Burcu Tung, University of California, Merced

The 2013 excavation season at Çatalhöyük marked the second year of a four-year excavation phase of the North Shelter. During this four-year phase of research, we will focus on revealing previously unexcavated occupation areas within the shelter to understand the stratigraphic relationships of the currently exposed buildings and building compounds. Ultimately, our aim is to reveal a contemporaneous Neolithic neighborhood for public display. This season, excavation took place within six main areas that contained a number of spaces and buildings (Fig. 2.1): the partially exposed B.102 in the Northeast corner of the shelter; B.112 and its predecessor B.119 immediately west of B.102; B.77; B.114 located to the east of B.77; B.108 south of B.77; and finally, B.52. Further, two small test trenches, GT1 and GT2, were excavated further down the slope on the northern end of the eastern mound to ground-truth some of the results presented through the geophysical survey conducted in 2012.

An important accomplishment this season was revealing B.119 at the northern end of the shelter. Further, through this season's work it became apparent B.102, unlike most buildings at Çatalhöyük which usually do not contain too much material culture relating to building occupation, was an extensively occupied building that gave important insight to the on the use of space and building activities through artifact and feature distribution within the building. Work within B.77 focused on the northeastern platform from where a number of individuals were excavated. Renewed work within B.52 uncovered a burial containing a flax cloth that was wrapped around an infant was actually preserved due to its partial carbonization.

### **Building 52**

Building 52 was excavated in the previous seasons and left for display for a number of years. As the unfavorable conditions of the North Shelter have caused substantial erosion on many of the features within the building, excavations were resumed this year. Work that took place this season therefore focused on the extensive recording of the building's architectural features before their imminent degradation and will eventually lead to the exposure of the building's predecessors.

B.52 has a rather interesting and unusual life history, in that it was constructed as a result of the joining of two independent buildings by the removal of their abutting walls centrally for the creation of a single building. The two predecessors of building 52 have been named space 147 and space 146 and remain unexcavated. One of the aims of the current excavations also focuses on formalizing the relationship of these structures to B.52. Through its life-history, Building 52 underwent a number of structural changes with the additions of side rooms to its northwest and its southeast. At one point, the building suffered a massive conflagration, which rendered most of it inhabitable. The residents then re-built a smaller building within B.52's main space, Sp.94, building upon many of B.52's features such as the northern platforms and the hearth.

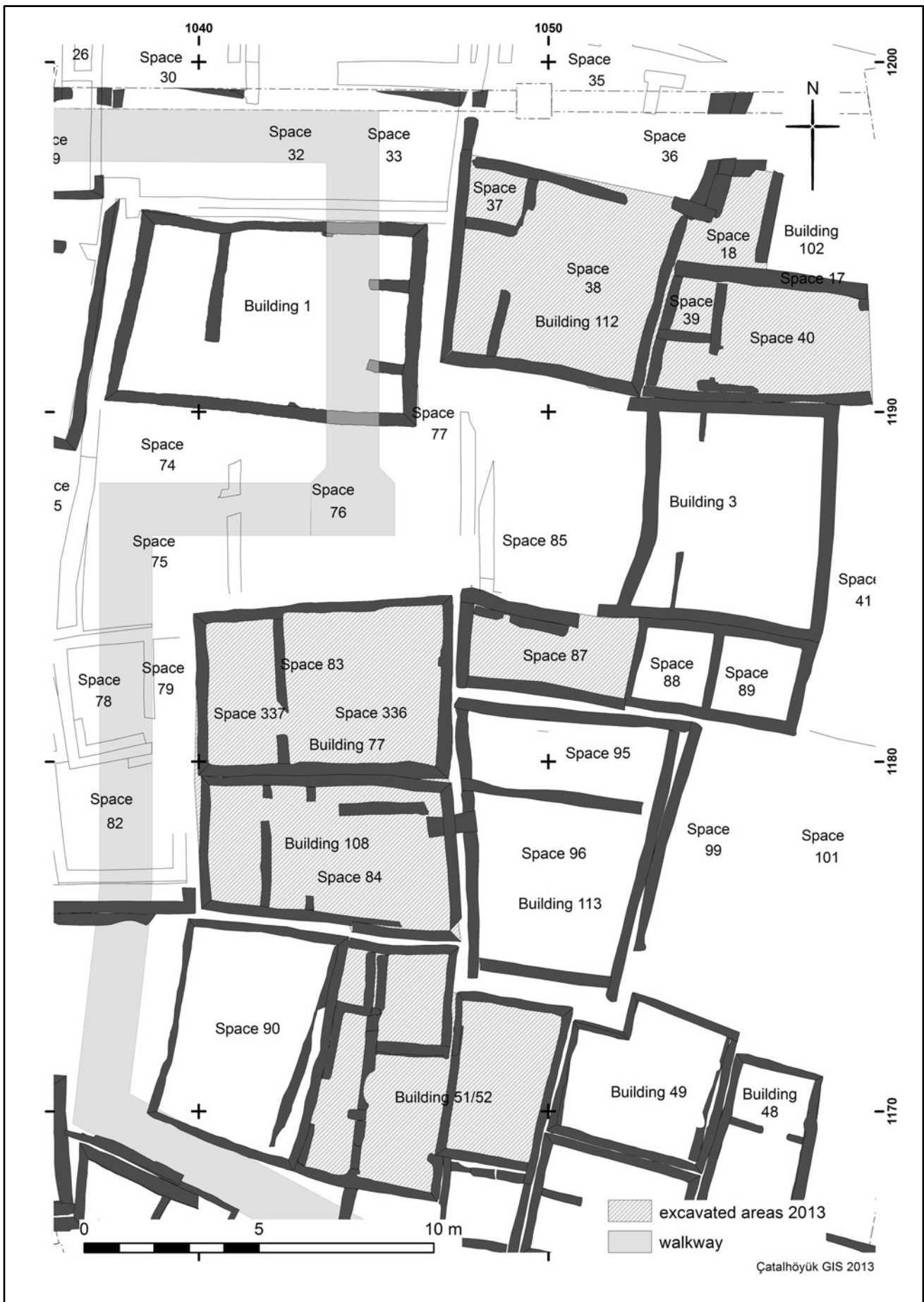


Figure 2.1. Excavation areas within the North Shelter in 2013. Plan: Camilla Mazzucato



Figure 2.2. B.52 at the beginning of the season. Facing west. Photography: Jason Quinlan

B.52's most prominent feature, other than its rather massive main space, is a bucranium nestled into the western wall of Sp.94 immediately next to a bench that has bulls horns set into it (see Fig. 2.2). This season, work in the building focused on the cleaning and excavation of the bench F.2021 with the bull's horns. Excavations here revealed an earlier partition / bench feature that was affixed with wild sheep horns. Further work was conducted on the northern platforms of the main room, platform F. 3694 to the west and platform F.3695 to the east were. Platform F.3694 contained burial F.7127, in which at least 7 individuals (but possibly nine, see below and Human Remains, Ch. 6); one older male and six infants of different ages were buried together. The preservation of the burial was rather unique due to the burning of the building immediately after the interment activities. One wooden bowl and a linen cloth made from flax were the prominent finds in this burial. Two separate burials were also removed from platform F.3695. Finally, the bins within Space 94, which were heavily eroded despite conservation efforts, were completely excavated.

### **The northern platforms of Space 94**

Excavations in 2006 removed the occupation sequences above the platforms of B.52 that belonged to B.51. As such this season, the two platforms were given new feature numbers: F.3694 is the northeastern platform while F.3695 is the northwestern platform. The two platforms had both undergone a number of re-plastering and re-furbishing episodes. Platform F.3694 contained one burial with nine individuals, at least seven of them buried at the same time, while platform F.3695 contained two separate burials with three individuals buried within them in total. Platform F.3694, about 1.4 by 1.4 covers a larger area than platform F.3695 which is approximately 1.30 by 1.1m. However, the latter platform is the higher of the two. Through time, the surface area use changed on both platforms with the addition of kerb F.3693 above platform F.3695 that acts a division between the two about half way through their known sequences.





Figure 2.3. The northern platforms of B.52. Platform F.3695 to the left and platform F.3694 to the right. Red plastered surface (20634). Notice the undercutting of the walls and the base of the platforms caused by erosion in the past years. Photography: Jason Quinlan

The earliest deposit reached in this area is beneath platform F.3694, a red painted surface (30528) truncated to the east. This deposit remains *in situ*. Sealing this were four consecutive layers of white plaster with thick grey make-up excavated as a single unit (30525). The upper most plaster layer slumped towards the northern end of the platform, into the northern wall. It is important to note here that some of these layers most likely extend further to the west, abutting platform F.3695 under kerb F.3693. Without the excavation of the kerb, which still remains *in situ*, it will be impossible to postulate the entire extent of these surfaces. No finds were associated with these rather well defined and uniformly laid surfaces that nevertheless had been affected by the conflagration of the building.

These maintenance layers were contemporary with a number of events that took place on platform F.3695. The earliest deposit revealed here is a plastered surface (30516). This surface was cut into by burial F.7120 (cut 30517, fill 30518). An adult (30522) was buried in a tightly flexed position, head to the west, lying on its back, arms to its sides, and hands by its feet (see Fig. 6.2). An infant (30523) was placed immediately above its legs and pelvis area (see Fig. 6.3). The infant was flexed lying on its right, its limbs disturbed due to later burial activities. There were numerous beads associated with the infant found both within the fill and associated with the skeleton. 30523.x1-4 are rows of beads (Fig. 2.4) found around the ankles of the infant, are made from a soft pink and yellowish brown sedimentary rock. Further, two green beads, 30518.x4 and 30518.x5, were found in the abdominal region of the infant, very similar to those found within burial F.7120 associated with infant (30511) (see below). The remains of two other individuals (20661, 50521) were found within the fill of F.7120 (see Human remains, Ch. 6). The fill of the burial (30518) also contained a single shell, similar to those found in other burial contexts.



Figure 2.4.. Beads found by infant (30523) in burial F.7120. Photography: Scott Haddow



Figure 2.5. Pedestal scar F.7121 and surface (30504) on platform F.3695. Photography: Jason Quinlan

Burial F.7120 was sealed by a plastered surface supported by a make-up layer, excavated as a single unit (30507). The preparation of the plaster was done with the use of two different make-up deposit: a the predominantly greyish brown silty clay that was immediately under the plaster and a brown sandy loam that was used to fill in the slumping observed in the northern end of platform F.3695. These deposits, in turn, were covered by another plaster / make-up deposit (30504) that was painted in red. Similar to the earlier constructional surface, this surface also had two different make-ups as a preparation, the lower layer having within its matrix *“more kinds of inclusions, including small rocks, charcoal, and clumps of clay”* (LH, 20/07). Yet another plaster / make-up sequence, (20634), overlaid (30504). Again, two separate make-up layers were used to in preparation for a plaster surface that was painted red. The lower make-up was a bit more loose with a higher sand component in comparison to the upper make-up. Unfortunately the deposit was heavily affected by the fire in the building, making it impossible to distinguish amongst the different constructional layers in the southwest corner. It is important to note here that the surface of the platform, at

this stage had a very sharp slump towards the northern wall in its final 10 cm surface. The slump is probably caused due to the architectural instability of the walls.

At some point during the different maintenance episodes on platform F.3694, but definitely above deposit (30507), a pedestal-like feature was centrally set on the platform, by its western edge (see Fig. 2.5). Pedestal F.7121, was then later removed, as evidenced by a cut, (20941) that outlines its shape, appearing within (20634). Its infill (20674), having been affected by the conflagration of the building, was friable.

Red surface (20634) was also centrally cut by burial F.7112. The burial contained of a very tightly flexed adult female (20655) laying on its left, head to the west. Phytoliths were found around its femurs, pelvis, ankles and ilium, very likely being the remnants of a cord that was used to keep the body flexed. The cut (20648) was rather deep (0.56m), with the skeleton placed at the very bottom



of the cut. An interesting feature within the burial is the placement of the feet, right by the ledge where that was created through the stepping in of the cut (see Fig. 6.1). The infill of the burial was excavated in three arbitrary units due to its depth: (20651, 29652, 20654). Two shells, one that held red ochre within it 20654.x2, were notable artifacts found with the skeleton. The infill was sealed with a thick (0.07m) layer of plaster (20646) within the boundaries of the cut. These deposits in turn were covered with (20615), the first excavated deposit on the platform since 2006. This was a mixed deposit which included a lot of eroded platform material, but also, a renovation attempt to fix the slumping of the platform surface towards the northern wall: cracked ground stone were place within the slump and padded over with makeup for the preparation of undoubtedly straighter surfaces.

Before the major renovation attempt with the placement of the ground stone, as if the pedestal was not an enough of a visual marker, a kerb (F.3693) was formed to accentuate the separation between platform F.3694 and platform F.3695. The subsequent plastering and maintenance events on platform F.3694 after (30525) all abut the kerb. Above (30525), was plaster surface and make-up (30508). This deposit was comprised by finely layered plaster surfaces sitting upon a very thin layer of make-up. The northeastern end of the deposit, where the slumping occurred, was filled with broken ground stone pieces and then covered with make-up and subsequently plastered. It very likely that this renovation episode therefore coincides with the renovation that is evident in (20615).

(30508) was cut by burial F.7127. Here one male adult (30514) was buried with at least six (30524, 30513, 30511, 30510, 30512, 30515) but actually more likely eight (see Figs. 6.4, 6.5 & 6.6, Human Remains, Ch. 6) sub-adults ages ranging from 6 months to 5 years old. The human remains report give a thorough description of the individuals and the states of which they may have been buried in, which seem to include different phases of decomposition. There are a number of things that are extremely unique with this context. First of all, all of the individuals were buried in a single event: *“The individuals were buried together at the same moment. Indeed, no disturbance which could indicate several episodes of digging, depositing of new bodies is observed. The position of the different bodies, very intricate and often in direct contact is impossible to realize in several burial*

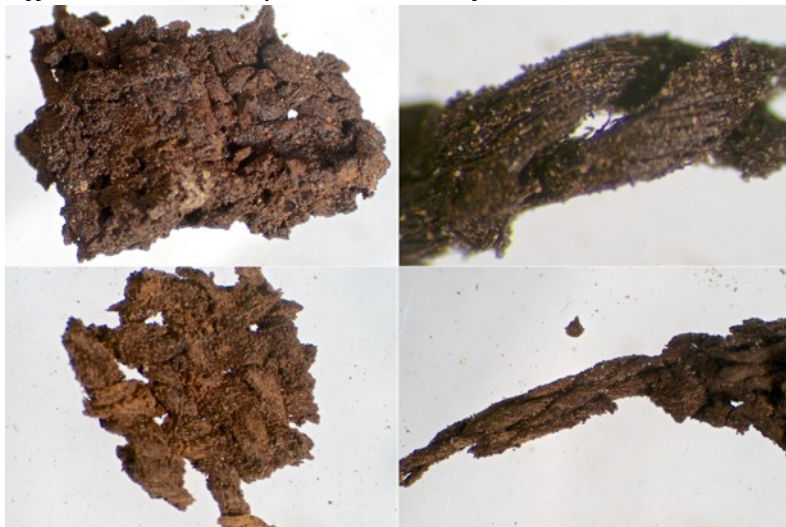


Figure 2.6. Close-ups of some of cord and textile recovered from burial F.7127.  
Photography: Jason Quinlan

*(episodes) without disturbances”* (RH, 28/7). This is certainly not a common incidence found on site. Second, the conflagration of the building literally baked the skeletons and the artifacts buried with them, allowing for the recovery of many organic items: *“The materials within the grave, protected by several layers of clay/plaster, in an anaerobic milieu, were not directly affected by the fire. They were ‘baked’, or ‘steam cooked’ (une cuisson à l’étouffée). Some organic remains were thus preserved: textile [between (30513) & (30511)], wood*

*[boat-shaped bowl covering cranium of (30513) and small artifact just above its feet], organic tissues [viscera and 'flesh' from baby (30511), brain from all the preserved crania within the cut], and fibers/roots (in red-painted shells). Specialists were able to identify linen/flax for the first time on the site. Because seeds of flax are absent at Çatalhöyük, the hypothesis of an imported textile from the Levant is plausible yet has to be tested. Concerning the wood, the specialists identify maple which is very rare on site and probably exogenous.” (RH, 28/7)*

The burial fill (30503) a large number of artifacts, some of which could be associated with skeletons. A number of shells were found within the burials, four of which were clearly deliberately placed with the burials. Shell 30503.x6 and 30503.x7 were most likely associated with the adult and both contained some brown sediment with what seems to be colour pigments mixed with fibres and roots. Two green beads, 30503.x1 and 30503.x2 were found on both sides of the head of infant (30511), and may very have likely been its earrings. Similar beads were also found in burial F.7120, discussed above. A complete marble bracelet, 50503.x8 (see Fig. 12.1, East Mound Ground Stone report), was found at the bottom of the fill. While its impossible to associate it with any one of the skeletons due to the disturbance that was caused by animal burrowing, it most likely belonged to one of the infants with its relatively small circumference. A shiny metallic triangular pendant that had a triangular crystal structure on its one side was found underneath the cranium of the adult. Also, a bone spatula was found at the very bottom of the fill. The textile was found between infant (30511) and child (30510). It is not possible yet to associate the textile, 50503.x9, with any one of the individuals. Further work is necessary to understand the nature of the piece, which is definitely the best preserved sample found on site so far.

This burial was sealed by a number of plastering events, which were largely eroded and disturbed due to their burnt fragile state and further exposure to elements since 2006. These deposits were excavated as a single unit, (20614).

### **Platform F.2177 and related features**



Platform F.2177 stood almost 0.5m high from the central floor area in Sp.94. it is defined to the west by wall F.2106 and access hole F.2109, to the south by wall F.2012, to the west partially by wall F.2013 where it doglegs in towards the central western area of the space. Post F.2179 was at the southwestern corner of the platform. The platform stands higher than its neighboring platform, F.2174 to the north. This season's

Figure 2.7. Earliest features uncovered by platform F.2177, including the wild sheep horned partition, F.7118 and later partition addition F.7315. Facing west. Photography: Jason Quinlan

excavations revealed its rather complex history, where different partitions were created to delineate specific areas on the platform, including one that rested immediately under the horned bench, F.2021.

The earliest horn adorned feature on platform F.7122, was in fact a narrow partition feature, F.7118, which extended from the western wall of Sp. 94, above the northern edge of the platform eastward some 1.2 m. Oblong in shape, it was 0.3m thick at its eastern end 0.16m thick at its western end, standing 0.2m above the floor surface it was built upon (30519). The partition had at least 5 sets of wild male sheep horns set into the partition. The first pair was still attached to a cranium, which was cut and placed within the feature (see Fig. 1.4). This pair was placed above a sixth pair of horn. As the feature is not excavated, it is not entirely clear how the rest of the horns were placed, although it seems as though they were placed individually, but still mimicking their anatomical position. The feature is rather unique in its expression, and, as a predecessor to a horned bench, certainly puts into question the use of the term "bench" in discussing these architectural forms.

A major modification to the platform occurred with another construction episode that incorporated the horned partition F.7118. This was the construction of F.7315, a feature that delineated a space above the platform, about 1.3 x 1.1m through construction of partition walls are about 0.2m tall and 0.1m thick, built with a pisé-like material (see Fig. 2.6). This partition abutted wall F.2106 at its southwestern end and the horned bench at its northeastern end. The core of the partition was made from a dark greyish brown sandy clay material that (30527), and seems to have been a built without any wooden planks to support the material while it was wet. This is evidenced my through its inner walls that *"were concave with clay applied in an erratic way without paying attention to creating smooth surfaces, which left hand and finger prints."* (MC 6/8). Its outer walls, while plastered, were also not smooth as to have been supported by a wooden plank during construction. The whole feature was plastered by a light grey plaster (30526). The northern part of the ridge, which attached to the horned partition was excavated due to its rather bad condition, having been heavily inundated by animal and insect activity. This made it clear that the feature was constructed above floor surface (30519), which has not been excavated. Northern face of the horned ridge was heavily plastered (20673). At one point, a plastering event that also covered platform 2174 lipped up against this ridge (20672).

Possibly contemporary with the construction of F.7115, but more likely earlier, is the construction of another plastered feature abutting the southern wall F.2012 immediately west of the access hole into Sp.290, F.7316, which was not excavated this season. At one point, this feature was extended and attached to F.7115, creating another partitioned area on the platform.

After some use, these features were filled by heterogeneous deposits (30506, 30509, 20657) and then uniformly plastered over with multiple layers of plaster which were excavated as single unit (20656). However, before the first plastering event, immediate above the junction of F.7315 and F.7316 after they were in filled, a shallow basin-like feature was cut (29660) into fill (30506). The 0.5m long and 0.5m wide 0.04m deep basin was formed with the compaction of a silty clay light brown material. This area was then consequently used as fire spot (20658), a singular burning event. This event may be the point in which the platform, which now stood at least 20cm above its initial

height, was cut at its northeastern corner for the formation of a step. This cut (30505), which would have originally have delineated a step about 0.7m long and 0.4m wide was about 0.2m deep, and exposed earlier floors (30520) that have not been excavated. This step was damaged by the fire and heavily eroded.

After the execution of a number of plastering events on the platform, the core of the bench F.2021 was constructed above F.7118. The sandy clay core, which was badly damaged by the fire of the building contained at least three large cattle horns on its northern face, creating an impressive albeit asymmetrical feature on top of a massive platform, F.2177. At the time of excavation, the horn cores were completely disarticulated from the bench, which was also eroded due to its exposure to elements since 2005. Once the bench was constructed platform F.2177 was then plastered multiple times. These plastering events were excavated as a single unit, (10300) identified in 2005. Before the removal of the bench, the remaining of bench collapse (11940) and building collapse (11937), which were left in situ to stabilize the bucranium, as well as the bench itself, were excavated to its north.

As mentioned in the introduction, a bucranium (11963) was set into the western wall of space 94, immediately north of F.2021. The bucranium had survived the building's fire without any damage, other than being scorched by the heat. Its protection has been interpreted as deliberation and is used to support the idea that B.52 was burned down intentionally. 13 horn cores were found piled neatly above the bucranium, all right-side horns, which apparently seemed to have been burnt elsewhere and intentionally placed above the bucranium (Farid *in press*). This season, after the removal of the building's rubble that was supporting the bucranium, the conservation team lifted the feature whole for preservation and study. As such, it was removed out of stratigraphic sequence and its construction has not yet been tied to the building's general stratigraphy. The bucranium was placed into cut (10162) within wall F.2106. A relatively loose fill (20649) supported its posterior and contained one antler 20649.x1 and a worked stone 20649.x2. While it is possible that the artifacts were placed intentionally, it should be noted that they could also been a part of the post-conflagration infilling process, falling behind the bucranium due to post-depositional processes.

### **Space 93**

Sp. 93 is situated near the northwest corner of B.52. It was accessed through the western space of the building, Sp.91, from its western side. It measures about 2m east-west and 2.4m north south and contains four relatively large and well defined bins that flank the northern and eastern walls. During excavations that took place in the room in 2005, a very large number of different types of artifacts, artifact groups, faunal, and floral remains were found. The discussion of the contexts can be seen at Farid *in press*. To grossly sum up the intricate and rather exciting findings, space 93 was actively being used for the storage of different types of grain, rather large quantities of meat, as well as stone and bone assemblages, one recognized as a bone working kit. Burnt rodent bones and pellets found in one of the bins point that the room was infested before its conflagration. Exposure to the elements within the North Shelter, despite the constant conservation efforts, have caused some erosion on the bins walls, particularly by the lower sections.

The excavations this season revealed the construction sequence of the bins. The first bin that was built within Sp.94 was also the largest one, F.2003 that stood at the northeast corner of the space.





Figure 2.8. Space 93. From left to right, bins F.2004, F.2005, and F.2003. Photography: Maciej Chylenski

The bin was constructed on a grey make-up layer (11920) that filled a slump towards the northern wall of the space, F.2008. Where the slump was this base was at least 15cm deep. The make-up outlined the foundation of the bin which was about 0.7`m wide and 1.84m long. The bin walls, which were excavated as a single unit, were made from two constructional elements: and inner core of grey make-up and an outer lying orangish brown brick like layer. The grey core actually abutted a plastered surface on walls

F.2008 and F.2007 which presumably belonged to the final plastering of Space 147. The outer yellowish brick layer abutted the upper reaches of the walls that did not contain any plaster.

Bin F.2005 and F.2004 were built at the same time and share a wall and measure 0.55m<sup>2</sup> and 0.65m<sup>2</sup> respectively. The construction of F.2005 (11960) abutted the southern wall of bin F.2003. After these squarish bins were constructed, all three bins were covered with a multiple layers of plaster (11921, 11961), presumably accumulated through time. Yet the first plastering event for the three bins was synchronous. The latest addition to the bin complex within the space was bin F.2002. Defined to its west, north and east by walls (including the wall of bin F.2003), its sole construction was a single wall that was about 0.84m long and at most 0.11m thick. The wall actually abutted the plaster covering F. 2003 (11921). Its eastern and western ends showed signs of repair. It was then plastered by a light grey silty clay plaster (20624), which was hardly preserved by the time of excavation.

### **Building 77**

While we hoped to completely excavate B.77 this year, the number of burials found within the northeastern platform (F.6051) and northern platform (F.6062) deferred our plans for following year. Other work focused on the northwestern corner of building as well as the southern end of the house. In the northwestern corner, a series of floor deposits, bin and basin remnants belonging to the earliest phase of the building were excavated. The southern end of the building provided an interesting insight and a puzzle on the history of the building itself. This season's excavations revealed that the southern wall of B.77, defined as F.3096, was in fact a later construction that only extends within space 336. The earlier wall, F.7303, must have become unstable at one point and therefore dismantled for the construction of the newer southern wall. Below is a more detailed description of the work that was completed in the 2012 excavation season.



## Platform F.6051

This season, four different burials were excavated from the platform while one individual was left for excavation in the next season. Through out the season, considerable effort was made in conjunction with the human remains team to clarify the sequence of burial and platform construction events. The summary of the burial sequence is as follows: Burial F.7309, is the earliest known burial. This was followed by burial event F.3616, which was then cut by F.7133. After this burial event, the platform saw some maintenance with make-up and floors (30102). Burial F.7137 at the eastern end of the platform was cut into these deposits and sealed by floor and makeup (30559). Most likely, around the same time, burial F.7132 was interred. All of these burials are primary, but disturbed burials. It is highly probable that the skeletons retrieved in 2011 within secondary burial features F.3620 and F.3619 were also initially buried within the platform at this time. Primary burial F.3697 (see below) cut both F.7132 and F.7133. This burial was placed within the platform after the construction of the pedestals. The closure of this burial was followed by the re-placement of bones seen through secondary burial features F.3619 and F.3620, excavated in 2011. In sum, the platform contains at least 8 skeletons and two crania.

The earliest burial, left *in situ*, is most likely the first burial that was placed within platform F.6051. The individual, whose cranium is currently exposed, cut into cut the make-up of the platform, (F.7309, sk.30551) which is also left *in situ*. This deposit seems to be the earliest construction of the platform. Primary disturbed burial F.3616, which was mostly excavated in 2011 (see Eddisford 2011, Hager & Boz 2011) was the next burial interred to the platform. This burial belonged to a mature female adult (sk.19529), that was disturbed by the interment of skeleton (20685), F.7133. Only its left wrist and hand remained *in situ*, tightly flexed and literally wedged to the western side of the platform. The remaining disturbed bones were actually collected in 2011, as loose bones that were placed above skeleton (20685). A bracelet, made from numerous dentalium shell beads, was found surrounding the wrist.

Burial F.7133, of primary disturbed skeleton (20685), was of an adult laying on its left side in a flexed position with its head to the south. The cranium was covered in cinnabar as determined by the portable XRF readings of high mercury in the surrounding matrix. A number of X finds were recorded within the fill of this burial, some of them most likely associated with burial F.3697 (such as the boar's tusk pendant X1.20989), some of the most likely associated with the burial below (such as the dentalium beads X8. 20989). Of particular interest, were the boar tusk pendants that were by the skeleton's right shoulder (X1.20989 and X4.20989), one pendant on each side of the scapula, suggesting in fact that the tusks could have been incorporated into clothing (Meskell, *personal comment*). The pelvis of the individual was actually cut by burial F.3697.

Burial F.7137 seemed to have been wedged into the eastern end of the platform within an oval cut that had a north-south orientation. The primary disturbed skeleton of (most likely) an adult male was laying on its left, with its legs flexed and knee level with the pelvis. Of the upper body, some vertebra, ribs and the left scapula remained. The cranium of the individual was most likely excavated in 2011 as cranium (19500), and is reported to contain preserved brain tissue (Hager and Boz 2011). The cut (30574) for this burial cut into the early floors and makeup (30102), while the fill (30548) was sealed by floors and make-up (30559) firmly placing this burial as an early burial event within the platform.

Burial F.7132 unfortunately was not stratigraphically linked with other construction events within the platform due to its later disturbance by burial F.3697. The burial is level with F.7137, cutting the early makeup floors and make-up (30102), and could have been sealed by floors (30559). This primary disturbed juvenile was laying in its right, with its head to the west facing south. Its lower body was cut by F.3697. No burial items were found in association with this skeleton.

Burial F.3697, a primary adult burial (skeleton 20683), laid on its back in a flexed position with its hands on its chest (see Fig 6.9) with its head to the northwest, facing southeast, was the final burial interred to the platform. The individual was buried with the cranium of another individual (20684) placed on its hips. The cranium was lying on its right side, head to the south and facing west, with no associated mandible or cervical vertebrae. Further, it was *“crushed by the weight of the grave fill which might indicate it was already skeletonized when it was placed in the grave cut”* (SDH, 15/7). Several beads were found, particularly in the center of the burial made from different materials (copper, stone, bone and shell) and shapes, 26 of which were recorded as X finds. A small speleothem 20686.x7 with a cavity in its middle was also placed with the individual. In fact, the speleothem and the beads may have even been within a leather pouch as a fine brown silty material surrounded the cluster of artifacts. Also within the grave, the imprints of a wooden bowl were preserved immediately by head of the individual. The skeleton rested upon sediment stained



Figure 2.9. 20686.x24, wooden bowl imprint.

orange, which is thought to be the remnants of burnt tissue. A similar residues were found in burial F.7136 within platform F.2617 (see below) and in B.52 within burial F.7127 also heavily influenced by a conflagration. The tissue of this skeleton would have been burned during the conflagration of B.77. The upper boundary of the cut associated with this burial (20922) was unfortunately disturbed, particularly by the activities that represent F.3620 and F.3619. The preserved bottom half of the cut was circular.

A number of interesting observations were made in the construction of platform F.6051 by the excavation of the different phases of construction through out the season. The core of the platform, make-up (30551) was most likely fashioned through the use of two planks shaping the extent of the platform. The sediment used in the construction of this core must have been somewhat plastic. Once this core was constructed, platform F.6062 was made, as evidenced by the abutting of the make-up of this platform to (30551). Then series of floors and make-up which overlay the make-up of F.6062, were excavated as single unit (30102): *“The lower make-up consists of about a 1 to 2 cm thick fine sandy clay loam which has a large number of plant inclusions within it. In fact the plant remains are in good condition due to the partial carbonization caused by the fire in the building. More interestingly the floors above the make-up simply peel-off to finger imprints... The impressions suggest that the make-up was rather wet and padded down while quite malleable. The very clean edge of the platform suggests that there may have been a frame holding the make-up in place.”* (BT, 27/8)

These deposits slumped towards the northern wall, ultimately creating an uneven surface for the Neolithic inhabitants. What is interesting is the placement of a number of broken clay ball pieces to the slumped region, in the northeast corner of the platform itself, before the next remodeling phase of the platform (30559). This composite unit, which is the same as (20498) defined in 2012, consisted of a make-up that incorporated the clay balls within its matrix and perhaps up to five fine layers of plastered surfaces above. The placement of the broken clay balls while can easily be interpreted as functional response to the slumping of the platform, may actually represent an intentional symbolic placement, as the same effect could also be achieved through the use of make-up. Further, similar deposits within the same contexts are observed in B.52, but with the placement of broken ground stone instead of clay balls (see discussion above, platforms F.3694 and F.3695).

### **The northwestern quadrant (platform F.3617 and associated features)**

Platform F.3617 was identified in 2011 extending almost 2.8m east-west and 1.6 north south, abutting the western and northern walls of space 336 as well as platform F.6051. The southern edge of the platform dog-legs about 0.20 south after it hits the second structural post (17541) some 0.75m before it hits the western wall (F.3098) of space 336. This season, the make-up of the platform was partially excavated as (30590), (30597), and (20950). These deposits were slightly different in colour and texture from another, initially thought to belong to different burial fills. However, upon excavation it became obvious that the deposits simply were part of the platform's make-up. The very slight colour and texture change of these orangish brown to brown clay loam and sandy clay loam deposits can be explained through the construction technique of the platform. It seems as though wet 'buckets' of earth were dumped within an area framed by wooden planks, and then let sit to dry. This constructional make-up has not been entirely excavated.

Remnants of the earliest bin that belongs to this northwestern quadrant, defined as unit (30174) has been left in situ. This bin wall was constructed above the make-up of platform (F.3617), extending 0.7m on an east-west alignment about 0.5m from the northern wall forming the southern edge of a squarish bin/basin defined by walls to its North and West, and structural post F.6069 to its east. Immediately to the south, was bin F.7148, defined to the west by wall F.3098, the south by the edge of platform F.3617, and to the east by structural post (17541). This shallow bin/basin feature contained a series of patchy floors excavated as (30135). These floors were contemporary with (30175) and (30133), patchy floors defined in the central area of the platform. Floor (30175) was a single thick layer of light brown plaster that the width of the platform, but only some 1m E-W. Immediately above it extending the same size was at least four fine sequences of floors and make-up were excavated as a single unit, (30133).

(30133) was sealed partially at its southwestern extent by (30134), burnt make-up and floor deposits that are most likely the remains of bin F.6061. This deposit is most likely contemporary with deposit (30163), three series of patchy floors in the northwestern corner of Sp.336 that partially sealed the earliest bin construction, and floors (30111) and (20934) that were immediately under the construction of bin F.3613. At this point, for a short time, platform F.3617 seems to have been devoid of any features other than the already existing structural posts. This might be point in which the incised geometric pattern placed (19049) on the northern wall, which may even be linked to the infant and children burials found within F.3617 (see below).



Figure 2.10. Base of bin F.3613 abutting post F.6069. The pit on the right is belongs to neonate burial F.3642. Facing north. Photography: Renata Araujo

However, soon after, bin F.3613 was constructed on platform F.3617. Defined in 2011, F.3613 was looked like a post scar, however, was “repeatedly plastered with white marl on the inside and outside ... contained degraded chalky limestone or marl” (Eddisford 2011:36). It was built abutting the western end of the incised panel. Years of exposure to the elements unfortunately degraded much of the upper parts of the bin. This season, we removed the partially excavated marl deposit (19270) as well as the remaining plaster (20910) surrounding the bin. A polished

worked bone object, 20910.x1 was found by the northwest corner of the bin, although the object way also be associated with the post-hole of F.6069, a more common context for the placement of such objects, and moved due to animal burrowing. The excavation of structure of the bin itself revealed more information on construction techniques:

*“The construction (20921) consists of 2 separate materials laid in the same time. The inner-most core was a greyish brown silty clay while the outer core was an orangish brown silty clay. It almost looked like the greyish brown core could have been a re-used brick as it also had a very fine layer of plaster on its south facing side. This plaster could also have been used as a binding agent. It really is hard to say. The construction was badly preserved on its northern, eastern and western sides.” (BT, 09/07)*

This season two infants were excavated from eastern end of platform F.3617. Burial F.7130 contained a number of disarticulate bones within its circular cut (20987), about 0.5m in diameter. An animal burrow that ran through this feature connecting to platform F.6051 to the east most likely caused most of the disturbance seen in the burial and explains the occasional adult bones found within the fill. Only the cranium for skeleton (20983) was preserved in situ towards the southern end of the cut. This cranium belonged to a juvenile. Another badly disturbed cranium of a different juvenile was found within the fill (20930) along side a number of disarticulate bones. Burial F.7130 was cut by primary burial F.7136, which belonged to another juvenile (30545), buried in a flexed position on its right with its feet to the north and head to the south, facing north. This burial must have also been one of the final burials placed within the building before the conflagration as within the cranium was carbonized brain tissue as well as some orange residue surrounding the matrix of some of the bones. It is clear that at least four infants and juveniles were buried within platform F.3617, including the basket burial uncovered last year (F.3642).

### **The southern wall (F.3096) and related deposits**

This season, excavations in the southern area of space 336 revealed a major modification that took place during the life history of the building: the re-building of the entire southern wall of Sp.336.



While not entirely exposed by the end of the season, F.7303 was the original southern wall of B.77, observed under oven F.7108. The later wall F.3096 was built stepping about 0.20m further inward, slightly decreasing the activity area of Sp.336. A series of truncated Neolithic floors (30176) seen on the section of the southern façade of Sp.336 must be floor sequences tied to this earlier wall, as they continue under wall. F.3096, and therefore were not completely excavated this season. The current excavations show that wall F.7303 was completely dismantled at the top of its preserved height, and stepped in for the final 4-5 courses for the construction of the newer wall F.3096. The latter wall was built using a very similar mud brick (20610) observed in the rest of the building. However, the mortar (20611) used in F.3096 exhibits a silty clay loam texture with more inclusions



Figure 2.11. Renata Araujo and Sophie Ekstrand dismantling wall F.3096. Photography: Jason Quinlan

than the mortar observed in the rest of the building, that seems to have been composed of a clay rich sediment evident through its blocky structure, hence making it more resistant to heat.

It is unclear why the residents of B.77 saw the need to dismantle and then re-build the southern wall of Sp.336. Initial thoughts regarding the destabilization of the wall's integrity surrounds the placement of the massive fire installation, oven F.7108 and the heat it probably produced.

It is also possible that the original wall became unstable as it was constructed on infill (see discussions surrounding Sp.511). Architectural instability is a common occurrence across the mound in different levels, due to the different weights different surfaces carry. Often times, response to such instability by the Neolithic residents has been to build second abutting walls, unintentionally exacerbating the restraint on the carrying capacity of a surface as seen in the southern walls of the buildings 65-56 sequence in the South area. Regardless of the reason, which should become clear upon the completion of excavation of B.77 in the following season, the dismantling of wall F.7303 and the building of wall F.3096 in its place represents a unique response for such a case.

A niche-like feature, immediately west of oven F.7108 that extends about a meter and is 20 cm wide, was excavated and proved to be series of activity deposits associated with the earliest wall construction that were truncated during the Neolithic most likely due to the re-build of the southern wall and other fire installations. The earliest deposit excavated here, (30167) was the truncated remnants of the base of the earliest yet identified fire installation, F.7308. Extending about 60cm east-west and only some 20cm in width, this layered burnt surface remains *in situ* for excavation in the following season. This surface was sealed with a light brown sandy clay loam make-up (30166) which was prepared for light grey, relatively clean, three consecutively plastered surfaces excavated (30160) as a single unit. It is not clear which activity areas these truncated



Figure 2.12. Base of oven F.7308. Facing south.  
Photography: Arkadiusz Klimowicz



Figure 2.13. The trace of the construction cut (30165) for oven F.7108. Photography: Arkadiusz Klimowicz

surfaces are related to, however, it is almost certain that they were truncated to the north by re-furnishing activities taking place within the building, just as their eastern extent was truncated by the construction cut (30165) for oven F.7108.

Immediately above the plastered surfaces was a burnt make-up layer (30159) which was truncated as the previous activities to its north and east. Not having a surface, it is unclear what this deposit is associated with but it could well be the remnants of a hearth. This deposit was sealed by infill (30155), which in turn was sealed by another burnt deposit (30153) that had a surface. These deposits were abutted to the west by an infill (30152) which most likely is a deposit associated with the later platform, F.6058, located in the southwest corner of Sp. 336, excavated in 2011 (Eddisford 2011). These deposits were sealed on the eastern side by multiple layers of plaster and make-up that seemed to form an oblong niche 0.65m wide, 0.10m tall and 0.25m deep, with its base at the same level of the earliest truncated floors (30176, see above) sitting immediately east of oven F.7108. The niche itself abuts oven F.7108 to the west. It is unclear what this niche actually represents. It may have originally supported a

wooden plank in its later use. Nevertheless, it originally was repeatedly plastered, at least 15 to 20 layers with a grey silty sand loam make-up.

Oven F.7108 was cut into the original southern wall of space 336. The construction cut discussed above, (30165), was also clearly evident upon the excavation of the superstructure (30170, 30171) of the oven. This construction cut (F.7307), also cuts infill (30168), most likely the infill of the predecessor of B.77. A light brown sandy clay loam heterogeneous infill (30164) was utilized before the construction of the oven's superstructure. The oven, which contained 4 main series of oven floors, is discussed in detail in last year's report (Tung 2012:17-18). The oven must have fallen out of use with the decision to actually renovate the entire southern wall in B.77. As the wall was dismantled, some sections of it must have been used to infill the large oven. This evident through the nature of the inclusions found within the infill of the oven (20448), particularly the large chunks of plaster. After the infilling of the oven, it was sealed by a number of blockings, the final one (20424) being the same texture as the mud brick using in wall F.3096.

## Building 102

Building 102 was first identified during the excavation of the foundation cuts for the North shelter in 2007. The northern and northeastern third of the building remains covered, beneath the foundation trenches. Work within the 2012 season focused on uncovering the occupation sequence in the



Figure 2.14. Overview of B.102. Photography: Jason Quinlan

western and southern portions of the building, covering an area of 5 by 2.5m. The exposed portion of B.102 is defined to the north and east by the extent of excavation. To the west, it is defined by wall F.3652, which dog-legs further west before it joins with wall F.3655, the southern wall of the building. The southern wall runs over 5.5m before it hits the excavation trench to the east.

The internal space is divided into two areas, Sp.17 and Sp.18 by F.3688, a free-standing wall/bench-like feature located towards the western end of B.102.

The exposed areas of B.102 contain a complex history of use and refusal, with intense modification of different domestic features as well as the discard of numerous artifacts and seems to be an unusual building in this sense.

### **Oven and hearth sequences in Space 17**

Space 17 is the larger living space of the building, although only its southwestern end is exposed. Befitting general configuration of houses at Çatalhöyük, the southeastern corner of the space contains a sequence of ovens and hearths.

The earliest oven exposed, F.7305, partially cuts into the southern wall F.3655, and remains unexcavated. It is contemporary with circular hearth F.7135 (20994), located to its northwest towards the center of the room, which also remains unexcavated. This hearth was also contemporary with another fire installation that was abutting its eastern end. The partially exposed section of F.7124 is trapezoid in shape, 0.65m wide and 0.45m long and has gone through at least 3 re-flooring events. Curiously, after the second re-plastering event (20974), a small rectangular basin-like feature (F.7131) was constructed in its center right by the excavation trench. The partially exposed feature measures 0.18 x 0.18m and stands 0.05m tall. Cut (30581) was plastered (30573)





Figure 2.15. The eastern end of space 18, photo facing south. Oven F.7305 is at the left hand side, associated with circular hearth F.7135. Bin F.7115 abuts the southern wall on the right hand side. Photography: Stella Macheridis

with a light grey marl-based clay (30573), which was consequently sealed with a homogenous orange clay loam. The whole feature was consequently buried by preparation layer (30973) for hearth base (20962). The use for this curious basin feature within hearth F.7124 remains a mystery.

Both F.7124 and F.7135 were sealed by make-up (20951) and (20979), which was in preparation for relatively thick (4cm) plaster layer (20949) that formed a platform F.7117.

Abutting later oven F.7101, the exposed portion of the platform

extends 2.5m and is 1.4m wide. Platform F.7117 was cut (20695) for the construction of hearth F.3692. Squarish in plan with rounded corners, hearth F.3692 was about 0.8 x 0.8m in size, and placed immediately above earlier hearth F.7135. After heavily plastered use surfaces (20993, 20692), the hearth was remodeled through the construction of a shallow walls respecting its previous boundary made from a greyish brown make-up (20639) stabilized by the addition of fine packing (20641). The packing was then plastered (20640) and eventually repaired (20630) with a final plastered surface (20633).

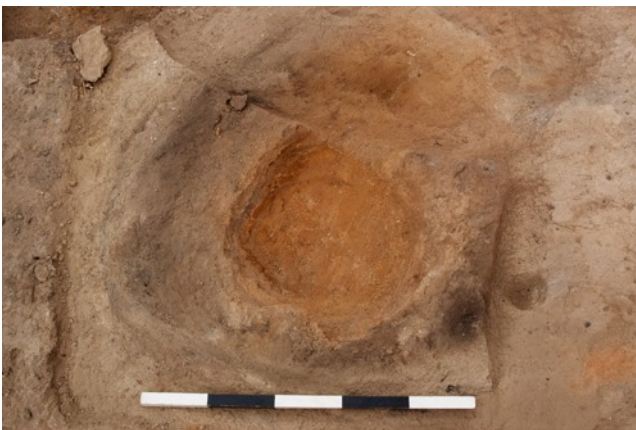


Figure 2.16. Hearth F.3692 cut into platform F.7117. Photography: Stella Macheridis

Hearth F.3692 was contemporary with oven F.7101, evident through the abutment relationship of its platform and the oven's wall, (20612). Oval in shape, the exposed length of the oven is 1.1m while its width is 0.7m. Rather impressive in size, the oven had five major re-plastering and one remodeling event. Built above a fine make-up layer (20690) with the construction of wall (20612), its opening must have been to the west, where post-depositional processes have truncated the structure. At this stage, the first floor (20687) and its consecutive two major re-plastering events, makeup (20681) sealed by floor (20643)



Figure 2.17. Oven F.7101, excavated by cross section. Earlier oven F.7305 can be seen. Photography: Jędrzej Hordecki



and makeup (20642) sealed by floor (20637), abutted the southern wall F. 3655. Then make-up (20629) was added for the construction of wall (20632) to the south which restricted the internal size of the oven. Surface (20626) abutted this wall, and followed by a final maintenance with makeup (20613), slight repair on the northern wall (20902) and floor (19598). There must have been at least one more final occupation surface, which was truncated after the ovens abandonment, as evidenced by make-up layer (20617) that seals the latest oven floors excavated.

Unfortunately the floor sequences related to oven F.7101 and hearth F.3692 were truncated. Floor (30542), excavated at the eastern end of the space immediately north of the oven and hearth sequences, are related to the earlier hearth not yet excavated. This floor sequence is most likely contemporary with floor (30543) and floor (30544) located on the western end of the space. These patchy floors are fine packed orangish brown clay floors that are badly preserved and difficult to follow.

### **Bins abutting the southern wall**

Abutting the southern wall near the threshold area immediately east of post scar F.7141 was a rectangular bin, F.7115. Measuring 0.85m by 0.4m, standing 0.3m tall, the bin's marl-based construction (20916) was contemporary with the floor (30543), (30544) and (30542). The plaster collapse (20915) that sealed the completely homogenous and clean bin fill (30560) contained an obsidian point 20915.x1. Further down the southern wall, within Sp.18 is bin F.7116. This rectangular bin, about 0.5 x 0.7m in size, is not entirely excavated. Its fill, only partially excavated as (20926), contained quite a bit of plaster collapse as well as some ground stone pieces. Its removal revealed internal division (20954) within the bin that has not been fully exposed. Further, fill (20953) remains to be excavated.

The deposits surrounding bin F.7116 contained a large number of artifacts. The earliest deposit arrived at this point is infill (30139) that has not been excavated. Above it, by the threshold area was a phytolith rich-thin floor surface (30593) in which the phytoliths represented the remains of matting. This deposit was sealed by clay and stone packing (30587) that was in turn sealed by a series of stone clusters (30586, 30582, 30580). (30582) also contained large animal bones, and a hammer stone with traces of red paint. The stones within (30586) were broken quern stones. These deposits are more likely with the abandonment phase of the building.

### **The "threshold" and features associated with division F.3688**

A number of different activities took place around division F.3688 (20908, 20906) relating to burial retrieval and construction activities. The earliest deposit excavated in this area this season represents an unknown retrieval activity. F.7140, located at the eastern side of the division, was an oval cut (30103) 1m long and 0.3m across, placed perpendicular to the division. Its fill (30799) was homogenous and contained no artifacts. It seemed as though the cut was made to retrieve an item that was buried under the floors of the building. Once the item was removed the remaining cut was sealed with a clean infill. Then, the area was leveled by a number of maintenance activities (30595, 30588, 30579, 20981) for the construction of basin F.3699.

Basin F.3699, measuring 1m by 0.7m across, was constructed (20958) from a marl-based clay and its base was plastered a number of times (30578, 20957) with depositions of make-up in between (30577, 20993). The deposits did not contain discernable artifacts. The basin was eventually cut

(20997) at its southern end for the interment of neonate (20998). The baby was placed in the cut, as though it was sitting, with its back leaning on the western side of the cut, head facing east (see Fig 6.10). The fill (20991) of this burial, F.7134, contained the tip of an obsidian point and an animal phalanx, and was relatively disturbed to its east due to animal activity. The burial was sealed by greyish brown silty clay occupation surface (20986), which in turn was cut by a pit (20976) located at the eastern end of the bin. Pit F.7128 was about 0.35m by 0.45m and contained fill (20956) that had a number of ground stone intentionally placed within the fill. While much of the ground stone seemed to derive from quern stones, two stones were definitely used for polishing, most likely, plaster. This eastern side of partition F.3688 was then sealed by fill and collapse (20925, 20907) relating to the building's abandonment.



.Figure 2.18. Jędrzej Hordecki working on fill (20294) of bin F.3698.  
Photography: Stella Macheridis

Immediately opposite to basin F.3699 was on the western side of side F.3688, was bin F.3698. The bin was constructed with a marl rich clay deposit (20923) and measured about 0.6 by 0.45m. Its fill (20924) contained a number of finds: one sheep horn core laid above two cattle horn core, all seemingly placed together intentionally as if jutting out of the wall. Two worked stones and one stone bead were found in addition to a number of other animal bones. The placement of these objects seem intentional and may point to specific activities upon analysis. The bin was cut by burial F.7138, whose boundaries were

difficult to define during excavation. The burial contained the primary burial of infant (30589), which was laid down head first: *"... (Its) skull was found under its back, and with arms on either side of the skeleton. The whole act of deposition should be associated with the last (perhaps) usage of the bin F.3698 since it was cut into it. It was also cut in respect to the partition wall F.3688. This seems not have been a regular burial. The dead child was not placed in the same manner (with the same care) as F.3691 and F.7134 in Sp 17. This fill was homogenous and hard to distinguish. The question is if this should be considered a formal burial at all, but rather a deposition of a dead child quickly filled with infill material."* (Stella Macheridis, 27/7).

Neonate burial F.3691 was found in the threshold area between post F.7141 that abuts the southern wall immediately across F.3688, and F.7306, another post-scar like feature that abuts F.3688. Together, these features form a passageway, or a threshold between the two spaces. The burial event of neonate skeleton (30589) within the overall fill of the building, delineated in this area as (20992) must be related to the abandonment of the building.

### **Building 114 (Space 87)**

Building 114, also known as space 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, B.114 constitutes an unusual building containing evidence for extensive symbolic activity throughout its life-history. The BACH team partially excavated the western third of the space. Last season, we began to work in the unexcavated eastern two thirds of the building to connect the two excavation areas stratigraphically. Last year's work focused on removing the infill of the building which ended up being much more of a challenge than anticipated. Numerous animal bones, horn cores, one bucranium, two human skulls and headless human body were found within the clay rich heterogeneous fill which seemed to have cemented through intentional compaction.

This season work within the building was conducted by a micromorphology specialist, Aroa García-Suárez who will essentially be 'slicing' the building to understand its micro-stratigraphic sequence for her PhD Thesis. As such, work during this season focused on a 1m 'slice' within the building that is defined by the BACH trench to the east and the walls of space 87 to the north and south. Here, platform / bench F.7114, which underwent a number of truncations, was recorded. Further work was done to connect the stratigraphy of the BACH teams previous excavations with the current excavations. Overall, a number of infill, make-up, and surface sequences were excavated. The nature of these deposits differ from those in a typical Çatalhöyük house, particularly in terms of the truncations that they have undergone during their use-lives. Also, this season it became even clear that the building's post, which rested in the middle of the southern wall, was removed after the commencement of the infilling process. The post-retrieval pit (F.7113) was infilled with a series of burnt deposits containing an abundance animal bone. Again, the stratification processes seen in the post-retrieval pit have not yet previously been observed on site.

Thus far, despite expanded work within the building, the processes that took place in the shaping of its deposits remain to be clearly understood. Focusing work on small "slices", while useful for understanding micro-stratigraphic sequences, is a challenge in tying the stratigraphic units within an already partially excavated space.

### **Platform F.638 and related sequences**

It has become clear that the western end of the space, which includes platform F.638 and a rather complex burial sequence mostly excavated by the BACH team but also in the previous season, had undergone a number of modifications. Platform F.638 abuts the southern and eastern walls of Sp.87, at the southeastern corner of the space.

The earliest deposits so far uncovered is the original construction of platform F.638. A white plaster ridge (30177) outlined an orange / red clay make-up (30178) that extends 1.4m east-west and 1.2m NS at the southwestern corner of the room. The make-up was covered with thick layer of plaster (30172) that "*varied in thickness from a few mm to 2cm, which seems to be the result of the action of surface smoothing for the infill of superficial unevenness*" (AGS, 4/8). At this point the platform became slightly smaller, the construction of kerb / lip F.7303 which took over the western 10cm width of the platform. This lip is associated with an adjacent platform / bench, F. 7114 to the west (see below). Platform F.638 was then re-furbished with a greyish brown to dark brown sandy clay make-up (30140) and white plaster floor (30114) that was made up of multiple fine layers.

At this point platform F.638 went through another major modification. The northern end of the platform was cut back about 10 to 15cm, for the creation of platform lip F.7304. The construction of this thin lip was a light grey clay make-up (30158) covered with multiple fine layers of white plaster (30157). This lip was abutted by compound layer of plaster and make-up (30596) that was sealed with grey floors and make-up excavated as a single unit (30109). These small occupation surfaces (1.40 x 0.5m) abutted the northern and eastern walls of the building. It seems these later occupation surfaces post-dated the plastering of platform F.7114 (see below).



Figure 2.19. The core of platform F.638. Facing north. Photography: Aroa Garcia-Suarez



Figure 2.20. The core of lip F.7304. Facing north. Photography: Aroa Garcia-Suarez

### **Platform F.7114 and prior sequences**

On par with the methodological decision to 'slice' the building, an area only 1m wide immediately west of the BACH trench was excavated. The most prominent feature within this area is a medium sized post-retrieval pit that cuts through quite a bit of occupational sequences. Many of the floors and make-up layers discussed below have a slope towards southern wall of about 10 degrees. The lack of artifacts and the extremely fine laminations seen in the area hints at a rather intensive use of space that involved thorough cleaning before re-furnishing. As such the features and uses of space within this central area of the space seem to change drastically through time.

A light greyish brown compacted clay floor with a orangish brown silty clay make-up has excavated as a single unit (30562) comprises the earliest activity in this area. It expands through the entire area, abutting the ridge of platform F.638 to the west, dipping into the undercut of the southern wall and extends under support wall F.3681. This will become clear next season, with the complete excavation of the support wall. This floor was sealed by a 2-5cm thick heterogeneous infill (30550) that extended across the same boundaries of the floor below. It was cut into at its currently defined northwestern corner by a shallow pit about 2-3cm deep and probably 0.35m in diameter that contained re-deposited layers of ashes (30561). The boundaries of this pit extend into the western



section. It is important to note that the context includes at least three different layers of ashes that are separated by light brown silty clay. The pit must have been used as a very specific refusal area as the context surrounding it showed absolutely no signs of burning or fire installations. This pit was sealed by a series of grey floors about 1 to 2mm thick, each supported with an orangish brown silty clay make-up. Covering again the entire exposed area up to the platform ridge, these floors were excavated as (20914) at the western end and as (20985) at the eastern end. The eastern extent of the floors may have actually been less used, as more layers were visible, particularly above (20985). These were excavated as a single unit (20978).

At this point we see a slight change in use in this small space. First, the undercut of the southern wall took a small repair with the placement of a packing layer (20984) by the southern wall, by the post would have been. This may have been a preparation for the platform / bench that was about to be constructed. But before the construction of the platform / bench, a shallow oblong pit was cut (20980) immediately above floors (20978) about 0.80m in length, 0.5m in width and 0.01-0.09m deep. Shallow pit F.7129 was used as a fire spot, in which its infill (20961) contained rich plant remains including charcoal, burnt seeds and phytoliths:

*“No installation was found for this combustion location: it resembles a hunter-gatherer camp fire. The walls of the cut were lined with clay, and no layering was visible in their section, which raises the possibility that the clay was intentionally placed against the walls of the pit for controlling the spread of heat and the risk of setting the building on fire (was there a roof at the time?). The walls and bottom of the pit show signs of rubefaction (reddish colour), but the presence of charred plant*



*remains and the absence of further changes in the sediment seem to indicate that this was a low temperature fire. The absence of internal layering in (20961) and sediment deposition point to the possibility that this was a single burning event. Towards the base of the pit, a concentration of grass-like phytoliths was found. The southern half of (20961) consisted of dispersed ashes and burnt plant materials. The (clayish) sediment in this area was heavily cracked, which might suggest, again, heat impact. No animal remains or artefacts were encountered. The feature seems to represent an 'opportunistic' activity area and there is no clear explanation for this behaviour. The fact that the ashes were not brushed and that floors were built directly on top of this feature might point towards the possibility that this feature is related to ritual activities of some sort.” (F.7129, AGS)*

This shallow hearth-like feature was sealed by a single grey floor (20952) about 1mm thick, similar to the sequence of floors beneath it.

Figure 2.21. Fill (20961) within pit F.7129, with post retrieval pit F. 7113. Facing north. Photography: Aroa Garcia-Suarez

Here, we observe another radical change of use within this small area with the fashioning of thin bench / platform like feature in the final occupation phase of the building. Feature 7114 extended from the southern wall where a post was located. Extending 1.5m north, its northwest corner kissed the tip of support wall F.3681. It was 0.7m wide and 0.10m thick, much lower than typical platforms and benches. The construction elements used for the feature is not typical with an expected bench / platform core. It may reflect opportunistic use and re-use of different constructional elements, or the extensive transformation of an older feature no longer recognizable in their original forms. The overall make-up of the platform (20944) was a heterogeneous deposit comprised of different materials – red clay, grey mortar-like sediment, burnt building materials, and plaster. Its eastern corner was perpendicular like the plaster above it, but actually convex and lined with plaster ridge (20975), which was in turn abutted by another plaster lined re-deposited architectural element (20948). This northeastern corner also contained a bit of mud brick dump (20996). All of the discussed units above comprised the core of the platform / bench, which was covered with a 1-2cm thick massive plaster surface that produced a uniform surface.

The lip of this feature (30954), which forms a boundary with platform F.638 was excavated partially in 2002, as well as in 2012 as (19480). At this point the southeastern platform was actually a few centimeters below F.7114. The lip of the platform was cut by a construction episode that involved the placement of floors and make-up (30109) discussed above. Further, this lip sits above number of packing features (39184, 39183, 2940) that were placed beneath the support wall F.3681, and abut the core of the platform / bench.

It is likely that the construction of the support wall is associated with the final use phase of the building, which incorporated this thickly plastered bench / platform. It is interesting if it is the case, as the support wall is heavily plastered up to 1cm thick, by layers of plaster excavated partially as a single deposit (30553). Some parts of the wall have quite a bit of soot on it, and the thickness of the plaster hints to a lengthy use. If that is the case, that there is only a single plaster layer, albeit thick, on platform / bench F.7114, hints that it was surface not heavily used. The stratigraphic links to such questions will be addressed in the following season.

The building was infilled with heterogeneous deposits that contained a large number of animal and human bones, excavated again only partially this year as (20967). Mid way through the infilling process, the post that was on the southern wall was removed. The cut (20697) for post-retrieval pit F.7113 had rather angular corners and a concave eastern side (see Fig. 2.21). Its irregular shape makes it distinct from other post-retrieval pits. 0.6m wide, 0.4m long and about 0.35m in depth, it was filled with a heterogeneous deposit (20696) similar in composition to the building's infill, but with very few artifacts. The deposit also contained layer of re-deposited ashes. A very clean deposit of clay (20912) was placed immediately west of the post-retrieval pit within the undercut of the wall can be considered as part of the infill of the building.

### **Building 112**

This season the highly eroded B.112 was excavated and recorded. Upon its removal it immediately became apparent that another building (B.119, see below) lay almost directly under it, albeit with a slightly different plan. B.112 is a squarish building measuring 6.25m east-west and 5.60m north-

south. It is comprised of two main spaces main room space 38 and smaller space measuring 1.5 x 1.5m at the northwest corner of the building. The foundation trench for the building's construction was only recognized after the removal of wall F.3674, which formed the small room to the northwest. Here, two surviving courses of orangish brown sandy clay mud brick (20918) bonded with a grey mortar (20917) were placed within a narrow foundation trench (20932). The northern, western and southern walls of the building were placed immediately above the walls of B.119. No trenches were associated with these walls and their particular placement reflects a high possibility that B.112 was constructed immediately after the abandonment of B.119. Also, it is worth mentioning that the later partition wall, F.7102, was placed close, but not exact, to the alignment of the internal partition of the earlier building.

Buildings with small rooms about 1 to 1.5m<sup>2</sup> that have been typically named "cell" spaces are not common at Çatalhöyük, although B.40 located immediately east of B.112 has a similar space defined in its northwest corner (see Tung 2012). At Çatalhöyük, it is possible, considering the size of this small corner space, that this feature may actually represent a platform outlined with mud brick. At least, the eastern half of space 37 contained the remains an eroded platform surface and makeup, excavated as (20699) and (20913). It is important to note that no burials were actually associated with this platform / space.

At a later phase of B.112, the main room was partitioned with the construction of wall F.7102 that abutted the southern wall F.6071. This wall extended 90cm to the north and was made up of two orangish brown bricks (20621) measuring about 30cm wide, 90cm long and about 5 to 10cm thick bonded to each other with a mortar (20620). No evidence for other features was found within the building. Some areas, particularly to the north and northwest (20636) and south (20616, 20631) of space 38 showed evidence of burning. Deposit (20631) contained some rubble within its matrix. All of the burnt deposits mentioned above respect the building's walls and therefore may be evidence for some form of conflagration that took place within B.112. The burnt layers in the southern end of the building were sealed by deposits (20901, 20623) that seemed to have a 'dump' quality to them, mixed with some midden material but not in situ midden activities.

### **Building 119**

Building 119, which comprises of side room Sp.512 and main room Sp.513, covering an area of 6.10m by 5.70m was immediately under B.112. Located east of the B.1 and 5 sequence, the building constitutes a typical Çatalhöyük residence, and has a some parallels with B.1 and B.3 in terms of its internal layout (see below). The building's infill was completely removed from its main room to reveal the configuration of its final phase, which contains multiple platforms, benches, post-scars, post-retrieval pits, and fire installations (Fig. 2.22). The infill of the main room was quite homogenous and did not contain many finds. In comparison, the side room of the building seems to have been infilled through multiple depositional events. Some of these deposits were rich in charcoal and ash and contained a large number of large animal bones. The infill in the side room has not been entirely excavated. Below is a summary of the deposits uncovered and excavated this season in both spaces.

### **Space 513**

As mentioned above, the excavations this season revealed the final phase of occupation of Sp.513. A total of four platform plank the space on three sides: Platform F.7137 is the largest platform that



Figure 2.22. 3D model of Space 513, Building 119. Model: Jason Quinlan.

is in the northwest end of the space. It is separated from the northeastern platform F.7319 by bench F.7318. Immediately south of the northeastern platform, abutting the eastern wall is platform F.7320. This platform is flanked by bench F.7121 to the south, which incorporated a post, as seen through post-retrieval pit F.7143. The building was most likely entered from the southeastern corner. A rectangular oven, F.7322, close this corner abuts the southern wall and is associated with a raised circular hearth (F.7323) situated immediately to its northwest, but still within the southeastern quadrant of the space. These domestic features are separated from the rest of the space by a kerb and another raised southern platform (F.7325) that abuts the southern wall and the internal division wall F.7325. No bins have been found within this main room. Another post-scar is located in the northwestern corner of the space. Further, yet to be explored, are two retrieval pits, one for pit associated with the aforementioned post-scar and one located in the western end of the space, immediately next to the passage way to space 512. The latter pit might be associated with the removal of a particular feature. A similar pit was found in a similar location, within Building 1.

An interesting, although rather badly preserved wall painting was found surrounding the northeastern platform. Outlines of lozenges were drawn onto an already extremely dirty wall surface, with red paint. The building was subsequently infilled.



It seems as though once the building's abandonment was decided, as with other Çatalhöyük buildings, the walls were knocked down until they stood about a meter high. The infill of the building in general contained quite a bit building material within its matrix. However, the materials coming from the walls were thoroughly crushed and mixed together, as much of the building material residues were not very large in size. In this sense, The Neolithic inhabitants took a lot of time to make sure that the building's infill had a relatively homogenous feel. To have a better understanding of the nature of the infilling process the building was cross-sectioned on a north-south axis. With the initial removal of all deposit south of west of the section it became apparent that the infilling process involved the utilization of the well-mixed building material rich deposits that were uniform in section. Lateral excavation of the deposits, however, made it clear that the infilling took place in three main stages: The initial covering of features, then the removal of left-over posts, then the complete infilling of the room.

Once the space was abandoned, an infill (20969, 30123, 30117) that also extended to the northern end of Space 512, was placed on the features, covering all of them. The infill was thicker in the southeastern corner sloping down towards the north and northwest, as if intentionally to cover the oven. However, it is also possible that at this point, the infill was brought into the room through the buildings roof entrance and dumped through entrance, causing the extra accumulation in this area. It is after this infill placement that the eastern post, located centrally on the eastern wall, was removed. Hence, the post retrieval pit (F.7143), actually cuts (30112) into both the initial infill and the occupation surfaces. Nothing extraordinary was found within the infill of the pit, deposit (30104) that extended towards the central area of the space. This deposit may correlate with the ashy infill (30101) uncovered immediately to the north, covering an area about 2.30 by 1.20m, more or less above the central eastern platform F.7320. The ashy deposits may be associated with some form of activity within the space after the retrieval of the pits. After this, the space was completely filled in with a series of homogenous deposits ((30569) and (30556); same as (20698)).

## Space 512



Figure 2.23. Fill (30127) in Sp. 512. Facing north. Photography: Numan Arslan

Occupation floors have not yet been reached within Sp.512. Even though the infill of this space is only partially removed, it is possible to say that the abandonment activities were markedly different than those that took place in the main room, although some parallels still do exist.

The northern end of the space seems as though it may have originally been structured to be a large bin, although further excavation is required to understand its exact nature. It is worth noting that this section is immediately below the peculiar cell space / platform of B.112. The infill found within the

northern end of the space is likely some of the earliest infilling activities that took place in the space. Here, deposit (30127) was confined by walls defining the space to the north and what might be a possible collapsed bin wall to the south (Fig.2.23). Large pieces of orangish brown brick and white layered plaster that seem to be part of wall collapse made a large part of the deposit. This context contained a large number of animal bones that seem to be intentionally placed, including one antler 30127.x2, two horn cores 30127.x5 and 30127.x13, and one worked bone 30127.x15. Quite a few pieces were found abutting, or very near the walls.

The rest of the room was infilled with a heterogeneous deposit greyish brown rubble-rich deposit (30563) that was about 10cm thick. Similar to what took place in the main space, after the space was partially infilled, a pit was cut through the infill, abutting the western wall right about midway through the space, where a structural post would have been supporting the roof. The removal of the post resulted in cut (30116), which was filled by two subsequent deposits (30106) and (20967). The earlier deposit (30106) was comprised of a relatively homogenous dark grey compact clay loam while the upper fill (30967) contained more chunks of building materials within its matrix. Both deposits were relatively clean, with no noteworthy finds.

Above the earliest infill excavated, at the southern end of the space, was another infill deposit (20968) containing large pieces of building materials (orangish brown mud bricks as well as pieces of plaster) as well as large chunks of animal bone. The deposit, most likely contemporary with the removal of the post in the space, is confined by walls to its west, south and east, diffusing into the infill towards the north, covering an area about 2.5m long and 1.15m wide. Animal bones were placed near the western wall include scapula 20968.x1 and horn core 20968.x2. Further, at least two fine lenses of ash were part of the matrix.

All of these activities were sealed by infill (20698), discussed above, which extended to the main room and is associated with the final infilling phase of the building.

## **Discussion**

So far, some practices that are seen in other buildings within the north area can be pinpointed: As in B.114 (Space 87) and B.1, some of the posts of the building were removed after an initial infilling stage of the abandonment. The placement of animal bones very near the walls is also a practice seen in other contexts in the North Shelter, particularly in B.114. Such practices were also common in other parts of the mound.

In general, building 119 seems to constitute a 'typical' Çatalhöyük house with its internal layout. The division of space is clearly marked in the latest occupation phase, with a distinct kerb separating the oven and hearth area to the rest from the rest of the building. No clear storage areas have been identified at this point. Finishing removing the building's infill in the smaller room the following season may provide more insight on that matter.

### **Space 511, Space 518, Space 488, Space 489, Space 490 and Space 84 (B.108)**

*with Arkadiusz Klimowicz*

In between B.77 and the B.52 complex, B.108 and the preceding activities and uses of spaces are crucial for tying stratigraphic relations in relatively large area within the North Area. Last season,

B.108 was cross-sectioned, where its eastern half was completely excavated. This revealed a number of spaces associated with midden activities that took prior to the construction of B.108. This season's objectives were to clarify the construction strategy of B.108, clarify the stratigraphic relationships walls F. 3646 and F.3679 have with the spaces they delineate, and explore the wall collapse found under the midden deposits within Sp. 489. The cross-section established in the season prior was respected, allowing an opportunity to observe B.108, midden activities prior, as well as the use and dismantlement of the building beneath B.108. Particularly interesting was the construction of B.108, as it appears to be incomparable to any other construction activities observed on the site till to this day.

Sp. 511, the earliest space uncovered in this area, is the southern side room of the only partially exposed predecessor of B.77. The main room for this building is presumable Sp.518, again, only partially exposed immediately north of Sp.511. Once the building was abandoned, both spaces were used as midden activity areas as spaces 489 and 488 respectively, with slight modifications in terms of how different spaces were bound. Finally, Building 108 was constructed, abutting building 77 above the midden sequences. Below are more detailed overviews of each space.

## Space 511



Figure 2.24. Final occupation phase of Sp.511 with Bin. 7139. Facing east. Photography: Arkadiusz Klimowicz

The earliest space uncovered in this small trench, Sp.511 is defined to the north by wall F.3679, to the east by wall F.7126, to the south by wall F.7125 and to the west by the extent of excavation. The northern wall, F.3679, extends about 2.7m and is 0.45m thick, and stands an impressive 2.1m. The southern and eastern walls both only stand about 1.1m high. These outer walls are slightly thicker than the internal wall, being 0.5m thick, and constitute some of the thickest wall examples seen in

North Area that belong to the Neolithic. The space itself was most likely the southern side room of a large building that was the predecessor of B.77 to the north; however, this needs to be further verified through further excavation.

Excavations uncovered the final use phase of the space. Floor (30592) and its makeup (30110) only partially uncovered in the southern end of the space are the earliest deposits. The thickness of the floor and the number of laminations as well as its ruffled appearance give an impression that it was an intensely used space in the past. A cluster of *“one half clay ball and 7 stones, including one piece of ground stone, 30598.x1”* (AK 28/07) was found on the southeast corner of the space. The stones seem to have cracked as a result of exposure to high temperatures. A greasy layer of dirty floors, (30591) sealed the cleaner floors. A massive scapula about 0.5m long (see Fig.2.24), was placed on the unit, although it was recorded during excavation as part of the overlying infill, 20988.X11.

Two features were defined within the space: one post hole, F.7302, located at the junction of the extent of excavation where the cross-section is established and the northern wall and one large bin, F.7139, abutting the eastern wall towards its northern end. Posthole F.7302 was not entirely excavated, but its cut (30552) was recorded. The fill (30151) of the cut was disturbed by extensive animal burrowing. Bin F.7139 is a unique example with its oval shape and construction technique. 0.56m long and 0.44m wide, it stands a 0.80m in height. The bin's walls (30576) were constructed using a coil technique, as noticed in the section its side: parallel flattened bulbs encircle the structure which are probably the remnants of coils either applied subsequently one on top of another or spiraled on the thick (4cm) base placed directly on the floor surface. Emergent gaps between several layers of coils were then smoothly effaced and merged on both the inside and outside of the structure, creating different wall thicknesses (1-3cm). As most bins at Neolithic Çatalhöyük, the bin does not use the wall's surface as its own wall. The bin was emptied at some point before abandonment and then infilled with a heterogeneous infill (30576), very similar to the infill observed within the room. While most of the infill of the bin was removed at the end of the season, the bin itself was not excavated.

The greasy floors and the features of the space were all sealed by room infill (20988) which was over a meter in thickness. The unit comprised mostly of crashed bricks, mortar and plaster fragments. There were also several interesting re-deposited feature parts contained within the lower stratum of the unit, which were could have belonged to elements from an upper story. At the southeast corner of the space, quite a few fragments of probable roof were recorded and sampled as 20988.s3, 20988.s4, 20988.S5 and 20988.S6 for further micro-stratigraphic analyses.

The infill of the building was sealed by half a meter of midden accumulation (20965) which actually sloped down by the eastern and southern walls. The deposit contained an abundance of organic inclusions, with areas of charcoal, and number of artefacts, especially animal bones, obsidian and clay ball fragments. There were also remnants of architectural features, such as the fragments of an oven super-structure, as well as crushed bricks and plaster. Only three small bits of pottery were found, consistent with the remains of the midden recorded in Sp.489 the previous season.

The midden must represent an episode in which Sp. 511 was used as an external space with no roof. Ultimately, the upper section of the southern wall collapsed towards the north, creating the midden



area defined as space 489. The collapsed wall, which was the upper sections of F.7125, was originally constructed with different building materials. The rubble (20942) closer to the standing wall is comprised of a dark grey mudbrick and orangish brown mortar that is also recorded in wall F.7125. The rubble most distant to the southern wall, (20943) is comprised of dark orangish brown mud bricks and a light orangish brown mortar. The different material used on the upper courses of the original wall may be indicative of a second story. From a stratigraphical point of view, the rubble represents the latest phase of space 511.

### **Space 518**

Space 518 is currently only partially exposed, 2.9m by 1m, defined to the south by wall F.3679, to the east by wall F.7126, to the north by the extent of B.77, and to the west by the extent of excavation which formed the cross-section. The earliest deposit within this space not fully excavated within the space is room the infill, excavated arbitrarily about 0.40m as (30137) defined for future excavation as (30148). The infilling process of space 518 seems to have been much more intentional, as the room infill was sealed by a firm clay-rich packing layer (30120) presumably for the construction of wall F.3646, which abuts the northern wall of Sp.511.

### **Space 488, 489 and 490**

Only partially exposed like the rest of the spaces in this area, Space 488 is defined to the north by B.77's southern walls, to the east by F.7125, to the south by support wall F.3646 and to the west by the cross section. Its excavated portion is about 3.6m long and 0.8m wide. After the construction of B.77, wall F.3646 was erected as a preventative measure to support wall F.3679 so that it would not collapse on B.77. Wall F.3646 was excavated until the cross section. It was constructed of orangish brown silty clay mud brick and a light grey silty loam mortar. The bricks were about 30 to 33cm in width and about 82-83cm in length. The wall was made up of ten courses of mudbrick and mortar and stood about 0.90m high. Further excavation is necessary to reveal the western extent of the wall and the space itself.

Space 489 is defined to the north by wall F.3679, to the east by the western wall of B.113, to the south by the northern wall of B.52 and its predecessor, and to the west by the extent of excavation. This open space was used as midden, which was excavated in the previous season. This season, the space's eastern extent was fully defined and recorded.

At some point of the use of both spaces, midden accumulation surpassed the dividing walls forming Sp.490, currently defined to the north by B.77's southern wall, to the east by B.113's western wall, to south by the northern wall of B.52 and its predecessor, and to the west by the extent of excavation. Space 490's lifehistory seems to be shortlived, as soon after its continuous use as a midden area, B.108 was constructed above the deposits, between the B.52 complex and B.77.

### **The construction of Building 108 (Space 84)**

This season, B.108's southern (F.3624/F.3623), eastern (F.3627) and northern (F.3626) walls were completely excavated within the bounds the excavation area, which left a cross section through the building and deposits below. Unlike other Neolithic buildings on the Eastern mound, building 108 actually had immense foundations that reached the walls of sp. 510. The builders may have decided to take this strategy due to either knowledge of an already existing structural instability in the specific area (see discussion below) or due to their reasoning that midden would not provide a

stable enough surface or another reason all together that might be impossible to infer. In any case, prior to the building of the walls, the inhabitants dug foundation trenches surrounding the walls. Particularly impressive is the trench, about 1.4m deep, associated with the building of the eastern wall F.3627. Then the walls were all constructed at once. The excavation of the walls revealed that both the southeast and the northeast corners were bonded to each other. Re-used mud bricks, some with plastered surfaces, were also used in the construction of the walls. These foundation walls did not have smooth surfaces. There were courses that jut out a few centimeters, not only causing an irregular surface, but also giving an impression of a different phase of construction. Nevertheless, the excavation revealed that these sections were indeed all sequentially tied to the same construction event, that of building 108.



Figure 2.25. Northern wall F.3626 of B.108 and the half-sized bricks covering the oven F.7108's superstructure. Photography: Arkadiusz Klimowicz



Figure 2.26. Top layer of the northern wall of B.108 is burnt through by the conflagration in B.77. Photography: Arkadiusz Klimowicz

The northern wall (F.3626) was particularly important to understand the stratigraphic relationship between B.108 and B.77, and proved to be an interesting puzzle: *"Its construction was the most complicated compared to the other walls of the mentioned structure. Especially in terms of a number of building techniques applied. It became clear that the lower layers of the wall were set, against common constructional rules maintained elsewhere on site. Due to lack of space that was restricted by already existing walls (from the south F.3646, and from the north F.3096), builders were forced to load reused bricks, pasting them using mortar by probably directly pouring the mixture into the prepared foundation cut. This is evidenced by broken bricks of different textures placed in varied positions that were immersed in an irregular paste of mortar... Removing several layers of the wall exposed the relationship between F.3626 and the superstructure of the oven (F.7108) of B.77. Worth noticing is that, before erecting the wall (F. 3626) the builders covered whole above mentioned fire installation using only mortar material coating the dome of the structure. In other words the construction F.3626 respects the oven, therefore the wall has later origins than the fire installation."* (AK, F.3626, 13/07/13). Further, a small section of the northern wall was actually influenced by the conflagration that took place in B.77 also shows us that the building was definitely constructed before its destruction, while still being inhabited.

The eastern wall and foundation (F.3627), standing an impressive 1.6m, was made up of 13 courses of mud brick (20676) bound with mortar (20677). Most of the bricks coming from this wall were 85-91cm long, 31-32cm wide, and 5-9cm thick. The southern end of the wall also contained half-size

bricks. The top six courses slumped slightly forward, creating an overhang 5 to 8cm wide. This wall may actually represent one of the deepest foundation walls ever excavated by the current team on site.

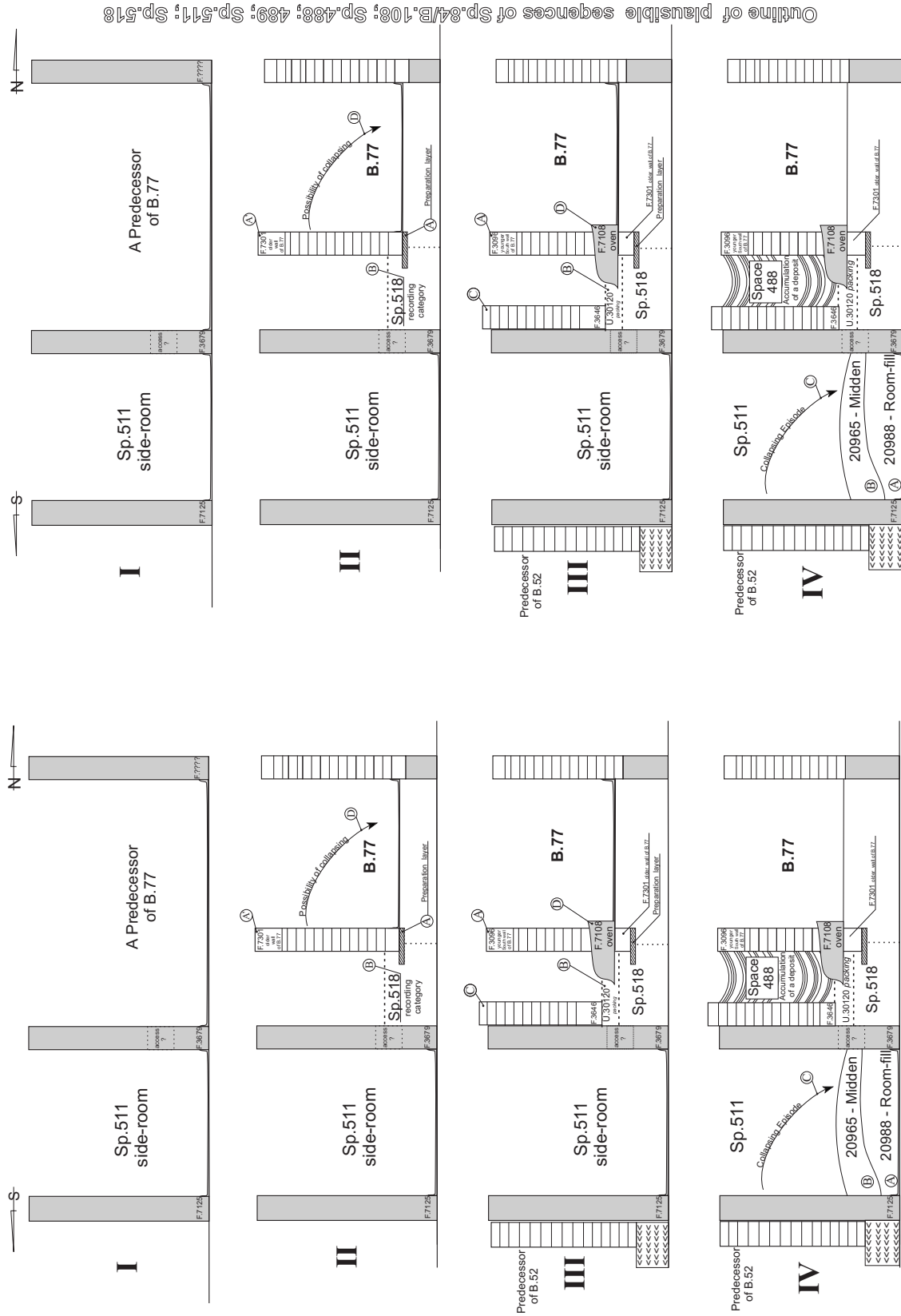
Excavations also made it clear that what had been identified as two separate walls, F.3624 and F.3623, are actually the same southern wall. It appears that the builders began the construction of the wall from either ends and as the eastern end of the southern wall extended towards the west, became slightly misaligned. As such there is a slight crossover on the southern wall that makes it appear to be two separate walls.

As noted above, re-used bricks were incorporated to the wall construction. In general all of the bricks were made from an orangish brown sandy loam. However, small differences in colour and texture of different bricks were observed both within and amongst the walls.

## **Discussion**

The cross-section utilized in this area produced a section that documents the stratigraphy across the different constructional and use phases of the spaces mentioned above. Figure 2.27, prepared by Arkadiusz Klimowicz, schematizes the eight main phases of events that took place within this area. The work conducted this year has been able to tie building 108 to the stratigraphy of North shelter, through its association with building 77. More work, particularly surrounding the B.52 complex will shed more light on the timescales represented in this small area. It is important to note that the midden seems to have actually been accumulated in a relatively short time. It seems also through the material culture and brick make-ups that the different phases overall belong to the middle sequence of the site itself. One of the remaining issues concerns tying B.113 immediately to the east to the rest of this sequence.

Other questions surround the relationship of Sp.511 and Sp.518 to B.77. So far, evidence seems to point to the fact that the building represented by spaces 511 and 518 is the predecessor to B.77. It is interesting to note that this building must have been almost twice the size of B.77, an already impressive and elaborate structure. What may have led the Neolithic inhabitants to downsize? What was the relationship of the inhabitants of B.108 to those in B.77 and the preceding building? Such a question assumes continuity in some form of knowledge or even lineage between the two buildings. Further excavations of course will shed more light on such issues. At this point, it might be possible to infer on the maintenance of knowledge surrounding structural integrity: Space 511's eastern wall is actually a double wall, which needs further definition in the following season. Can it be assumed that the construction of a double was a result of dealing with structural issues? And if so, could the construction of the massive foundation for the eastern wall of B.108 be a consequence of this knowledge? Another question surrounds the relationship of the dismantlement and re-building of the southern wall of B.77 and the construction of support wall F.3646. It is hoped that some of these questions will be resolved if excavations continue in the remaining western extent of B.108 and the preceding deposits as well as B.77.



Outline of plausible sequences of Sp.84/B.108; Sp.488; 489; Sp.511; Sp.518

Figure 2.27. The stratigraphic sequence of Sp.511, Sp.518, Sp. 488, Sp. 489, Sp. 490 and Sp.84. Schema: Arkadiusz Klimowicz



## Trench GT1

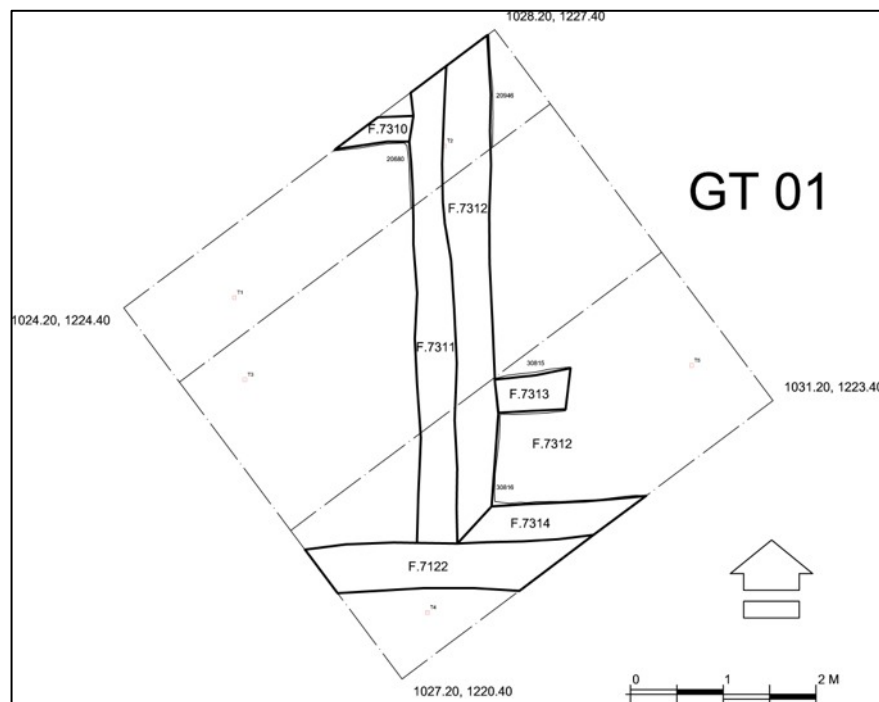


Figure 2.28. Overview of trench GT1. Plan: Marek Baranksi

Located approximately 15m off to the northwest from the entrance of the North Shelter, GT1 is 5x5 m in size. The trench was placed to test anomaly detected through the single antenna GPR survey, about 2-2.5m in width and 21 in length on a northwest/southeast alignment. Instead, work in this trench uncovered two neighboring buildings, B.123 and B.124.

GT1 was first excavated as a trench that was 5 x 2 m in size. In the beginning of the excavations, the southwestern corner of B.124 was actually thought to be a

post-Neolithic feature, namely a burial, due to its absolutely perfect east-west alignment, existence of post-Neolithic pottery within the surface material collected, and finally the grey colour of the mud brick. Grey mud brick is often used to line Post-Neolithic burials found within the North Shelter (see CITE). Due to time restraints, the trench was extended another 3m to the northwest to avoid the excavating supposed burial. The final 1m extent of the trench was treated as a sondage. Therefore, although a small trench, GT1 was stepped in twice for maximum in-depth investigation.

B.123, located at the western end of the trench is defined by wall F. 7311 to the east, and wall F.7122 to the south. Wall F.7310 seems to be an internal division of the building as evidenced by the slight corner of a space on its northern side. The walls of B.123 are all made of a brown sandy clay mud brick. While the southern wall of the building is poorly defined, its eastern wall is better defined within the sondage. Infill (30128) removed from this area contained occasional post-Neolithic pottery sherds due to the heavy bioturbation observed within the trench. Overall, the deposit was a rather typical homogenous building infill with occasional large chunks of building material such as plaster and The removal of the infill revealed a thick layered plaster (20680) on walls F.7311 and F.7310. As the depth of the sondage reached 1.90 towards the southwestern end of the trench, the excavation of infill (30128), still concealing the occupation deposits of the building 123, came to an arbitrary end.

Building 124 is located in the eastern half of GT1. It is defined to the south by wall F.7314 which seems to actually abut F.7122, the southern wall of B.123. The western wall of the building, F.7312, abuts the eastern wall of building B.123. This building is divided into two areas with wall F.7313, space 523 to the north and space 524 to the south. All of the walls of this building were constructed

from a dark grayish mud brick with high clay content. This particular colour and texture of brick is not extremely common and was initially thought to represent much later, post-Neolithic activities. However, the internal faces of all walls contained typical Neolithic Çatalhöyük layered plasters, leaving no doubt about the nature of the structure. The building's infill was partially excavated as fill (20945). As with B.123, the occupation deposits of the building were not uncovered. The infill of the building was sealed by unit (20935) which can be defined as a highly disturbed surface deposit that contained a large number of post-Neolithic sherds as well as roof tile.

It is impossible to assess exactly how large buildings 123 and 124 are or whether they are contemporaneous. But it is clear that the buildings had substantial life-histories, evidenced by the thickness of their wall plasters. In any case, the work in the trench did not reveal the anomaly that presented itself in the GPR results, and reminds for the necessity of caution in the interpretation of geophysical survey results. The trench was completely backfilled at the end of the season.

### **Trench GT2**

8 x 2 m in size and set in a east-west alignment, GT2 is located about 24m north of the North Shelter. The location of the trench was determined upon the results of the geophysical survey conducted last year. The aim of this trench was to find a north-south aligned feature at its western end. This north-south alignment seems to correlate with a division formed by abutting buildings also seen within the North Shelter, exemplified by the abutting relationships of B.113 with B.77 and B.108, B.119 with B.1, and the predecessors of B.52.

Indeed at the western end of the trench remnants of what could be called a wall were located some 1.1m below the surface. However, this brown compact mud brick was highly disturbed by animal burrowing and later activity and time and area constraints prohibited in-depth investigation. Deposit (30584), which is similar to homogeneous building infill, abuts this possible wall and remains *in situ* within the trench. It was sealed by (30585), a unit characterized by its building material-rich inclusions. The overall evidence of these deposits does point out to the existence of a north-south aligned wall, which most likely belong to a Neolithic building, as determined by the geophysical results. These deposits were buried later by midden activity defined by units (20971) and (39571). Extending some 3.5m towards the center of the trench, these units which produced large amounts of late Neolithic pottery sherds. Of interest was a handle made from a dark gray ware shaped as a bucranium. These deposits in turn were cut by a post-Neolithic grave that was left *in situ* within the trench.

These midden deposits were overlaying F.7147, another Neolithic wall located in the middle of the trench. Unlike the wall discussed above, the geophysics results gave no evidence of this feature. The wall was made from "*a compact light brown silty clay mud brick and ashy mortar*" (SE, 27/07/13). It was plastered on its eastern side and abutted by a disturbed raised floor surface recognized in the southern section of the trench. Wall. F.7146, made from a light brown silty clay brick and light brown ashy mortar constructed above this raised surface abutted the eastern face of wall F.7147. These features seem to belong to Neolithic building that runs on a slight northwest-southeast alignment, and are most likely not related to the Neolithic wall defined at the western end of the trench.

The eastern end of the trench presented itself with another set of deposits (30558, 20970, 20972) that were difficult to interpret. These deposits contained large amounts of light brown sand-rich mud brick within them, and could represent a demolished wall. All three units were rather homogenous and contained almost no artifacts. The deposits seem to have been cut into, with the construction of a possible pit/ditch comprised of fills (20999, 30557). These heterogeneous fills were charcoal rich and contained a large number of burnt building materials.

The limited extent of trench GT2 only allows for very general understanding of the nature of activities that took place in the area. The work conducted here over the summer also highlights the difficulties in making generalizations of the complex archaeological sequences at Çatalhöyük within restricted spaces, as discussed during the foundation trench excavations (see CITE). The test trench was backfilled in its entirety at the end of the season.

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### **3. Excavations in the South Area, 2013**

James S. Taylor, University of York

This season excavations in the South Area continued focused excavation upon the structures along the 'southern ledge' of the shelter (including Buildings 80, 89, 96 & 97), as well as the two structures adjacent to Mellaart's Shrine 10 Sequence (Buildings 43 & 118). All of the work was concentrated within buildings, no open areas or courtyards were targeted. Most of these structures were thought to have been constructed at a broadly contemporary horizon approximately Hodder Level O/P (Mellaart Level VI/VII)

The decision was taken to begin full excavation of the occupation sequence of Building 80 with a view to understanding the sequence and exploring the structures potential for reconstruction at a later date. Work also continued on the ongoing excavation and experimentation of digital recording in Building 89. In addition to this digital tablet graphical recording took place in both Building 80 and Building 118. Excavations were continued in Building 96 with a strong focus upon the complex burial sequence. Building 43 continued with a view to removing the occupation sequence completely, and work began on a new structure to its immediate north, Building 118. Notably the latter is believed to be of Level XII date. Both of these operations fed into the ongoing strategy to expand the area of exposure of earlier occupation levels relating to the Shrine 10 & 8 sequences and the deep sounding. The aim is to expose and understand some of the earliest activity and structures upon the site.

Excavations in Building 97 were only operational for the first part of the season, and were put on hold as priorities changed and resources were diverted to deal with Building 118.

#### **Building 43 (Spaces 235 & 236)**

Work continued this season in Building 43 from where it was left last season. Originally Mellaart excavated the structure as building E.VIII.27 down to occupation level in the 1960's. Although very little is reported on this building, the building's internal features generally correspond with Mellaart's 1965 plan of the building. In 2004, the building was completely exposed and excavations resumed at the horizon left by Mellaart, when 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.

The building has been severely eroded as a result of its long period of exposure. As such the 2012 and 2013 excavations continued with a focus on bringing the exposed material into phase and fully excavating the occupation sequence of the building, with a view to removing it and exposing any better preserved underlying structures.



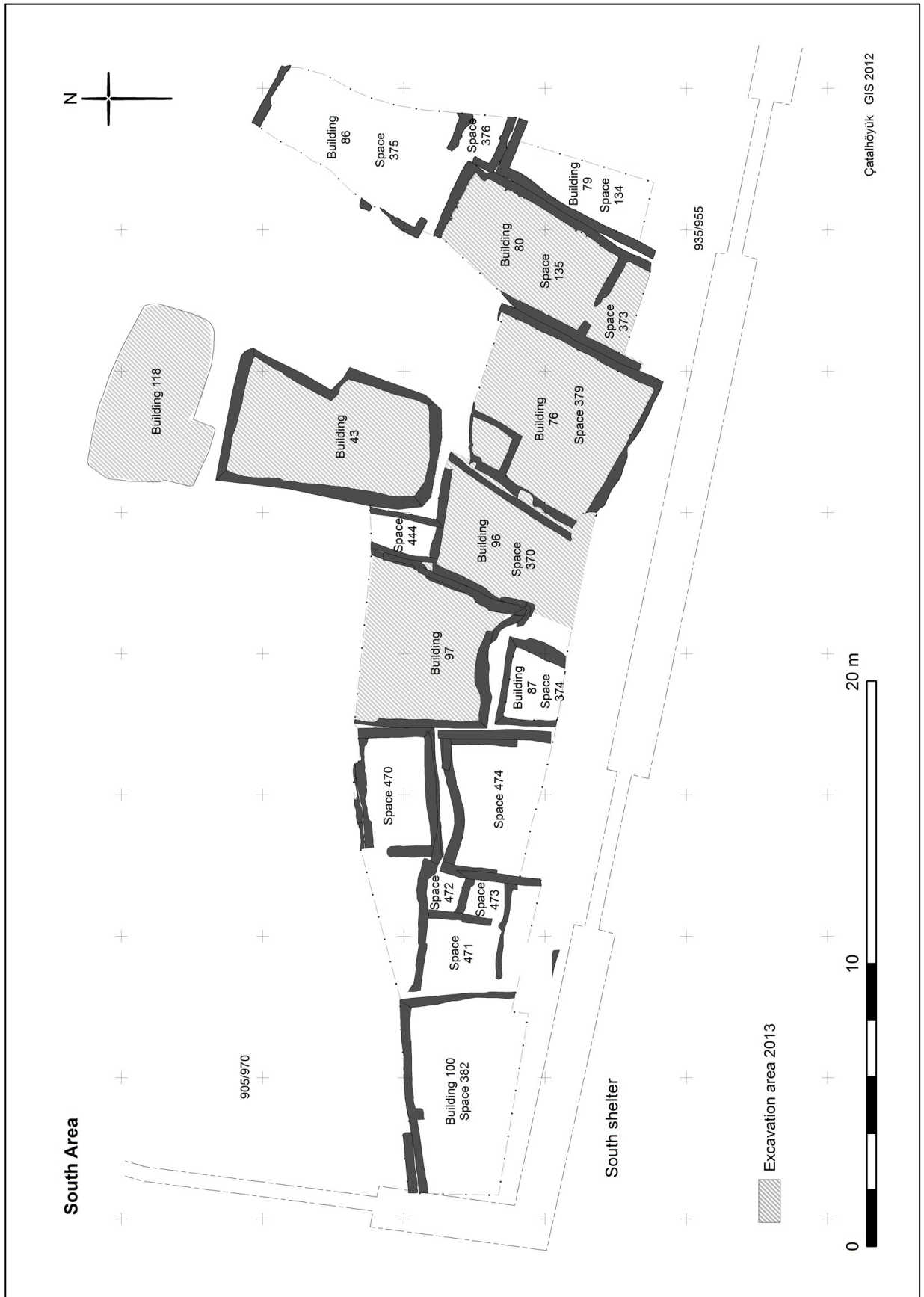


Figure 3.1. Areas of excavation conducted in the South Shelter. Plan: Camilla Mazzucato



Figure 3.2. Overview of southern space (Sp236). Facing west. Photography: Agata Czeszewska

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**

Space 236 consists of the main southern room of the building and at one time, it contained 3 platforms. Work in this space continued from that begun by the team supervised by Justine Issavi in 2012.

### **Northern Area, including the eastern platform and niche.**

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).

The niche (F.1865) in the eastern wall and associated platform (F.1851) defined in 2012, and partially excavated in that season were completed and understood this season. The earliest deposit to define this clearly associated pair of feature was a compound 'thin layer of grey make-up and orange floor', which effectively define the platform F.1851 as the first element of its construction (1.8m long by 1.00m wide). This was immediately sealed by a couple of thin further makeup layers,



Figure 3.3. Detail of niche (F.1865) and associated platform (F.1851) in foreground. East facing photo. Photography: Agata Czeszewska

with no clear associated surface (perhaps due to erosion wear or scouring in the preparation of the later platform layers, (30326) and (30324)).

At this point in the stratigraphic sequence on the northern side of the platform was a clear, cut feature (30322), thought to be a post-retrieval pit (c.0.72m long by c.0.70m wide and 340mm deep. Although on reflection, this would be an unusual position for such a pit; set against the northern fact of the dogleg on the eastern side of the space. However it remains

possible that the post was set into the corner of the platform. The homogenous, compact and almost sterile fill of the pit (30320) gave little or no indication of any alternative function for this feature.

Sealing the pit was another makeup layer, (30318), which was removed with an associated very thin and patchy plaster layer as a compound unit. This appeared to mark a separate phase of use of the platform. It also represents the platform surface that marks the beginning of use of the niche.

The earliest surface within the niche itself, (30317, was excavated as a compound unit along with its underlying makeup (because both layers were very thin and respected the same area exactly), 0.99m long by 0.48m wide and approximately 40mm thick. Immediately sealing this was another distinctive red painted plaster surface (30315), which appeared to line the base of the niche, apparently respecting the platform although there were some ephemeral indications that this paint may have covered the platform at this level (this may be a result of scouring and erosion since the initial exposure of the building in the 1960's).

Sealing both the niche and platform at this level were a number of units that were associated because they were seen to be 'in phase'. These included (30303, (30313, (30314 & (30316. For the most part these units represented apparently contiguous makeup and floor layers which extended from the niche and platform into the main space. These form the highest discrete surviving units upon the platform structure itself, at a height of c.1005.61mASL, making the platform at least 0.25m high. However it is worth noting that the highest, (30316, was a compound unit that consisted of a large number of truncated plaster layers (floors) associated with the top of the platform. However they were truncated badly (by previous excavation?) and only survived as a narrow strip against the northern wall of the dogleg in the space. If they can all be seen as platform surfaces (which is an assumption because their full spatial extents will never be determinable), then the actual thickness of the platform may be more like c.0.30-0.35m.



The last deposits which can be seen as part of this sequence, are all interpreted as niche fills, although it seems likely that many of them (if not all of them) would have effectively covered the platform either in whole or part, and have been truncated either in antiquity, or during earlier archaeological interventions. The first of these, (30312, was recorded as a clay-silt shelf within the niche on its northern end c.0.40m long by c.0.16m wide (50mm thick), which served to foreshorten the effective width of the niche. A compound layer of alternate thin makeup and white plaster surfaces, (30308, sealed this (c.70mm thick in total). These almost certainly would have extended out over the platform (although that relationship is lost through truncation) and may be associated with the similar compound unit: (30316 discussed above. This was sealed by more potential surfaces and makeup, (30306, although deposits that formed this unit were a little more irregular and harder to define. The uppermost fill in the 'niche sequence' excavated this season, (30307, was more homogenous and 'fill-like' consisting of sterile silt. Initially this was seen as part of the wall itself and did not become clear as a fill of the niche until wall plaster was 'chased behind by the excavators. The latest sterile niche deposit (10547) was excavated in the 2012 season. 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 fully excavated. In fact our understanding of the niche is sketchy and the feature is difficult to interpret because so much of it has been disturbed by excavation in the 1960's. The true limits of the floors identified in the niche cannot be determined because they are truncated, and the same can be said of the upper fills. Ultimately all the units which filled the niche were characteristically sterile (whether they be floors or fills). Structurally the niche itself is quite rounded and even in shape – but its true function remains enigmatic.

### Southern Activity Area



Figure 3.4. Detail of oven (F.1852) against southern wall of Sp.236. Facing south. Photography: Agata Czeszewska

This season the southern area was targeted in a concerted effort to try and free the oven previously identified as F.1852, but left unexcavated. In fact the oven superstructure, (30345 was the earliest unit to be exposed this season. The oven itself was some 1.00m in diameter, surviving to a height of 70mm, and was filled with a short sequence of burnt surfaces, which resembled fired clay. The earliest of these (30344) contained frequent charcoal inclusions, and was sealed by at least three more surfaces and their associated make-up (30343), (30341) & (30340); these uppermost

of these surfaces only partially covered the whole internal space of the oven having been damaged and eroded, all of them were heavily cracked and orange/black in colour showing signs of burning and heat damage.



To the west of the oven was a small makeup layer (30342), which may have been connected to the use of the oven, due to a relatively high degree of observed charcoal inclusions (c.0.90m long by c.0.70m wide and 60mm deep). This was sealed by a couple of compound deposits, (30336) & (30339), which essentially comprised short sequences of 'destroyed and truncated floors, makeups and rubble fill'. These units had been badly eroded and perhaps truncated by the 1960's excavation, only really preserved against the walls of the space, consequently they were essentially excavated as one arbitrary unit. Also situated abutting the southern wall of the space was the very lowest part of a clearly defined bin structure (30338), which was lined with white marl plaster (30337).

The bin and the western side of the oven were both finally sealed by poorly defined unit that may represent room fill or residual floor make-up in the southern end of the space (30333), approximately 2.20m long by 1.76m wide. Again this unit was particularly difficult to define because of erosion and truncation, but was essentially sterile homogenous greyish orange brown silt.

In the southwest corner of the space a large (1.32m by 0.98m) but shallow (190mm deep) pit was excavated (30334), filled with a sterile mixed light grey brown silt deposit, initially interpreted as make up until the cut became evident. The pit, which formed a quarter circle in the southwest corner, was fairly shallow, although it is possible that there may be more fill left *in situ* as the basal boundary of the fill was very indistinct.

The uppermost deposit to the east of the space was a grey silty 'make-up layer, (30301, which was also badly eroded and hard to define (1.00m long by 0.80m wide and 70mm deep). The basal boundary of this near sterile deposit was also hard to define. This was sealed by patchy floor, (10556), which extended throughout the centre of the space and into the southeast corner identified and excavated in the 2012 season.

### **Space 235**

Some considerable work was done in Space 235 this season, which was the northern (possible storage) area of the building, and was c.4.00m east-west by c.1.20m north-south. The earliest excavated deposit was a grey brown makeup layer (30328), which basically spanned the whole space. This makeup was apparently associated with a residual heavily weathered and patchy plaster floor (30327). At the eastern end of the space, also constructed upon the makeup were two very heavily scoured bin structures (recognisable only by the u-shaped plan of the residual plaster surfaces associated with them – (30321) & (30325)).



Figure 3.5. Overview of Sp.235. Facing west. Photography: Agata Czeszewska

Sealing all of these units was another makeup deposit, (30314), which suggested that the scouring of the earlier bins might have been deliberate and executed in antiquity. This makeup was similar in nature to its earlier counterpart (30328) and consequently the basal boundary appeared arbitrary in places (the two deposits were often only distinguishable because patches of plaster floor and bins which divided them). This makeup was again associated with another patchy plaster surface (30311). It is worth noting that all of these plaster floors were characteristically thin (>5mm) and showed no signs of the re-plastering, or maintenance that might be expected in the main room of the structure. Also associated with this very patchy floor and make-up was another later bin-structure, again heavily scoured out. The superstructure (30310) was simply present in plan as a horseshoe shape, filled with a grey silt infill (30309) no more than 10mm deep.

These deposits were finally sealed with another grey silty makeup layer, which again appeared to span most of the space, 4.1m long (east-west) by 1.3m wide (and up to 90mm deep), (30300). This deposit was again very weathered, although in this case almost certainly as a result of having been exposed by Mellaart in the 1960's and again by the current project in the early 1990's since this more or less represents the level to which this space was previously excavated.

Two pits excavated in the 2012 season finally cut this upper surface. One of the pits, (10550, was situated along the northern wall (F.1854) of the building (0.32 diameter and 0.12m deep) may have been a post-retrieval pit. The other pit, located against the northern side of the partition wall (F.1853) (0.58m diameter and 0.18m deep) was of unclear function.

### **Building 80 (Spaces 135 & 373)**

*Contribution by Justine Issavi (Stanford University).*

This year, excavations resumed in Building 80 after a two-year hiatus. The main aim of this year's excavation is to begin the removal of Building 80. Previously, the decision was made to use B.80 as a display building partially because of its incredible state of preservation and the elaborate wall



Figure 3.6. 3D Model of B.80. Model: Jason Quinlan

painting uncovered during the 2011 season, and partially because this building was not a high priority building for the C14 dating project as it was not part of the main stratigraphic spine being dated (Bayliss & Farid 2012). However, it has become apparent that excavating Building 80, because of its state of preservation and level of elaboration, would provide us with important material evidence that may not be preserved otherwise. Thus the management and excavation strategy for B.80 has shifted to allow the excavation of the building while planning on a future reconstruction of one of the earlier phases of the building. Accordingly, while the excavation goal is to remove the building completely, the building walls are to remain in place. Additionally, a small section of the stratigraphy has also been preserved along the wall edges in order to aid in the future reconstruction of the building's stratigraphy.

Furthermore, B.80 was part of a pilot project that aimed to fully digitize the planning process. Using the latest tablet technology from Microsoft, the ArcGIS software suite and site Photography equipment all graphic representations of the archaeology were digitally created and archived (For report and workflow, see Ch. 23).

### **Building 80 Overview**

Building 80 is situated to the east of the contemporary Building 79 and west of the earlier Building 89. This building consists of two rooms, the main room to the north Space 135 and a small possible storage space to the south Space 373. Building 80 was excavated down to its latest floors in 2010 and has remained mostly untouched since then. Though some work in the form of the excavation and partial removal of the northern and western walls (F.2533 and F. 5036, respectively) took place in the 2011 and 2012 seasons. Additionally, work was also done when the painting on the building's east wall was uncovered in 2011. Accordingly, plaster removal in search of paintings on other walls as well as the conservation of the existing wall paintings found has continued routinely since then (Lingle 2012).

## Space 135

### Northern Area

#### Feature 3442



Figure 3.7. Unexcavated portions of the burial sequence. Facing west.  
Photography: Katarzyna W. Harabasz

F.3442 is the northwestern platform belonging to B.80. The earliest features identified and excavated in this space were the latest burial events F.7400 in the northwestern platform F.3442.

The cut itself is oriented roughly east west and is 0.79m by 0.47m and is only partially excavated with a current depth of 0.16m. The earliest exposed (but not excavated) remains consist of two right pelvic bones with two articulated right femoral heads. Based on the position of the remains, the burials and the burial cut will extend to the northwest of

the current cut and the platform, very close to the edge of Mellaart's truncation of B.80 in the northwestern corner. These appendicular limbs also articulate with two right feet, one of which was excavated and removed at the end of the 2013 season because of its fragile and unstable condition. Other human remains were defined, including a number of disarticulated juvenile bones that were exposed and removed. These included a disarticulated juvenile cranium, without a mandible, (20036) which was removed and sampled for future aDNA analysis. To the southeast of the cut, a juvenile mandible and an articulated juvenile limb (arm) were uncovered. Whether or not these disarticulated juvenile remains belong to the same person has not yet been confirmed, although it is possible. The latest burial was that of an articulated and tightly flexed juvenile (20034), which was completely excavated during the 2013 field season and also sampled for future aDNA analysis.

The infill for this burial (20030) was relatively compact and was comprised of platform make-up material (such as bits of plaster and make-up) as well as more midden-like deposits which contained organic remains such as charcoal, small bits of animal bone and obsidian. This burial fill was highly disturbed by animal burrows and insect larva that, so far, have been ubiquitous throughout the burial sequence. As a result, the northeastern portion of the fill was more friable than the rest of the deposit. This is also due to heat damage from the buildings final disuse that was especially evident and concentrated in this portion of the platform. So far there have been no associated grave goods with this any of these burials, however, this sequence of burials is only partially excavated as of now and excavations will have to continue in future seasons (for a more in depth discussion of this burial sequence, see the Human Remains report in this volume).



A relatively compact layer of make-up (18992) sealed the aforementioned burial sequence. The depth of this make-up layer ranged from 0.02-0.06m and it seems as though it was used to remodel the shape of the platform. The make-up layer was in turn covered by a thin layer of plaster (18991). This floor sequence was in turn sealed by another floor sequence—make-up (18990) and plaster surface (18981). It is evident that there were multiple other floor sequences on this platform, however, very little of these sequences survived along the northern and the eastern edges of this platform because of a number of post-depositional disturbances. These post-depositional features include the burning and the fire damage from antiquity (concentrated in the eastern and central areas of the platform), Mellaart's truncation in the northwestern edge of the platform, as well as multiple animal burrows and insect tunnels present throughout the platform.

#### Feature 3441



Figure 3.8. Charred timber remains (18988). Facing north.  
Photography: Justine Issavi

The earliest deposit uncovered in B.80's northeastern platform is a layer of plaster with visible signs of burning and fire damage (18989). No burial cuts have been uncovered yet, although two distinct slumps have been noted in the northeastern corner and the central area of the platform. Furthermore, a slight outline of a potentially earlier platform is visible. This, however, cannot be confirmed without further excavation. This plaster deposit (18989) was sealed by one floor sequence—make-up (18987) and plaster surface (18980)—that showed similar signs of fire damage in the same areas. The make-up layer (18987) in this sequence had

contained evidence of organic plant remains and phytolith samples were taken from this deposit. Sealing this floor deposit was a bit of in situ charred timber (18988), a possible remnant from the burnt posts that had collapsed previously (18948).

#### Feature 3440

This central platform is located directly below the geometric wall painting found on the eastern wall of B.80 during the 2011 field season. Similarly to the northeastern platform, no burial cuts have been uncovered in B.80's central platform F.3440, however, two very distinct slumps—assumed to be indicative of burial cuts—have been noted in the platform's earliest uncovered deposit (20029). Stratigraphically, the wall painting predates the earliest exposed plaster deposit on this platform. Sealing this plaster floor is a make-up layer (20013) that contained a stone pendant 20013.x1; this pendant seems to have been a placed deposit, rather than an accidental or inadvertent inclusion within the make-up layer. This make-up layer was in turn sealed by a layer of white plaster, which was in turn sealed by a floor sequence (18979), however, unlike the earlier sequence, the latest floor sequence of this platform was very ephemeral and difficult to follow.

#### Main floor

The earliest deposit found on the main floor was a plastered sunken floor measuring 2.52m long by 1.84m wide with a depth of 0.04m. To the north and east, this floor is defined by the edges of the northern and central platforms. Furthermore, the sunken floor has clear western and southwestern

boundaries but is more amorphous in the southeast. This sunken floor, along with the complete removal of the latest phase of B.80's well-preserved oven F.5041 (discussed below), represents the only major change to B.80's internal features. There are two small areas with evidence of burning on this floor.

The clear western boundaries of the floor may have to do with the installation on the western wall F.5036 of B.80 (for more information, see Regan in 2010 Archive Report).

This floor must have been remodeled with the addition of the earliest phases of the hearth F.3436 as this hearth seals the main sunken floor. It is possible that an earlier, smaller hearth, that would be in phase with the sunken main floor, existed further south. It is also possible that this remodeling correlated with the remodeling of the eastern partition wall F.4038 in order to allow for a larger oven, although this cannot be confirmed without further excavation. To the north, the sunken floor was sealed by a thick layer of relatively sterile make-up (18982), which was in turn sealed by very small and ephemeral patches of surviving floor sequences around the edges.

### ***Southern Activity Area***

#### Feature 5041

During this field season, the latest phase of the oven F.5041 was removed all the way down to the construction horizon (20033), which was the earliest deposit in the feature to be uncovered (Fig.15).

This construction horizon seemed to go underneath the ladder platform F.3437, suggesting the possibility that the ladder platform, as well as the latest phase of the oven were built on the same construction horizon. This deposit was also sealed by a small patch of remnant floors (20037) further west, indicating the possibility of it being plastered before the construction of the latest oven base and walls.

Stratigraphically, the oven floors (20032, 20031, 20022 in stratigraphic order) sealed these remnant floors, although, we were only able to see that the construction of the oven superstructure preceded the construction of the oven floors after the removal of the upper part of the oven superstructure (18975). These oven floors were laminated, and scorched clay floors that were also prioritized and found to be relatively sterile with small to average amounts of fuel and plant remains.

The superstructure itself was made up of construction/make-up material and was mostly sterile, barring small pieces of bone or flakes of obsidian that were found. A number of samples from the internal/external facets of the oven walls, as well as the make-up material itself were taken. It is important to note that all components of the oven, including the superstructure, floors, and construction horizon were heavily affected by post-depositional processes, specifically animal burrows.

The latest phase of the oven was initially uncovered and excavated down to the oven floors in 2010. It is also important to note a cluster or a 'placed' deposit containing a number of bones (18955) and thought to be a part of the abandonment practices of B.80 was found on the broken roof of the oven (see Regan 2010). So far in the excavation of the feature, no similar deposits have been found;



Figure 3.9. Oven F.5041 and the multiple oven scars on F.4038. Facing south. Photography: Justine Issavi

furthermore, the floors of the oven that have so far been excavated have been reported as clean, scoured, and relatively sterile.

The oven remodeling seems to correlate with the remodeling and extension of the eastern partition wall (F.4038). Once the latest oven superstructure was removed, it became apparent that the partition wall F.4038 was plastered before the installation of the oven. Furthermore, a possible scar belonging to a smaller oven, measuring 0.44m compared with the original oven width of 0.87m, could also be seen on the wall F. 4038 (Fig.17).

Lastly, a discussion about the validity of phasing buildings based on oven phases was rekindled this season. Accordingly, we aimed to address this issue specifically in B.80 because of its high level of preservation. Though we have not been able to come to any conclusions to date because only one phase of the oven has been removed down to its construction horizon. Consequently, we aim to address this question during the upcoming excavation seasons.

### Feature 3437

Feature 3437 is an L-shaped ladder platform located in the southeast corner of Space 135—the main space of building 80—measuring 0.88m long by 0.67m wide, with a height of 0.08m. This platform contains and respects the charred remains of the ladder base (18963). Although stratigraphically the earliest uncovered surface of F. 3437 respects the charred ladder base timber, team members from the botany lab, excavated and sampled the top part of this ladder timber in an effort to save the charred timber from further damage from the adjacent excavation. A preliminary analysis revealed that the wood species is elm.

This surface was sealed by the earliest plastering event uncovered on F.7401, as well as a small patch of remnant plaster (20021), which survived only in the northwestern corner of the platform. To the east, near the western border of the oven F.5041, a small cluster of mini clay balls and charred bones (20020) was placed on this surface. Both of these deposits were then sealed by a compound layer (18976), which was excavated as a compound layer because of the heavy charring

and heat effects, as well as the uneven surface. This layer was used to remodel and enlarge F.3437 by 0.05m along the northwestern edge. Sealing this layer, was another heavily charred and patchy surface (20015) concentrated in the southeastern part of this platform. It is important to note that sealing this surface was another cluster of heavily burnt bones (18964), which was excavated in 2010. This late cluster was deemed by the excavator to either be a 'left' deposit or a collection of refuse left for future disposal. In any case, the bones were considered to have been placed or dumped there prior to the fire, as they were burnt and not broken up (see Regan in 2010 Archive Report). It seems as though the excavation of the earlier cluster (20020) in the 2013—which also contained a number of mini clay balls—could further support the 'left' deposit hypothesis.

#### Feature 7401

Feature 7401 consists of a raised area, similar to a platform, with an amorphous southern and southeastern boundary. It measures 0.96m by 0.63m and has a height of 0.05m (Fig.18).

Its earliest deposit consists of a plaster floor that was deemed to be part of the same plastering event as that of the surface of the bench F.3439 to the north as well as the earlier phase of F.3437 to the south. To the east, this plaster surface seems to have been scoured away. The southwestern portion of this surface is heavily charred. This context is sealed by one floor sequence, which can



Figure 3.10. Feature 7401. Facing east. Photography: Justine Issavi

only be seen in the northwestern corner due to erosion. Two heavily charred floor sequences, (18977) and (20016) respectively, that were too charred and uneven to be distinguished were also excavated. These layers sealed the more robust and recognizable plaster surfaces. The relationship between these deposits and F.3437 could not be clearly determined because of the heavy charring of the deposits and the unevenness of the surface.

#### Feature 3436

Feature 3436 is a raised hearth with an irregular shape and a molded rim and sides. The upper surface of this feature measures 0.63m long and 0.55 wide. The earliest deposit belonging to this feature that has been uncovered is a compacted hearth floor, which was sealed by a patch of dirty floor to the east (20038), as well as a much more friable hearth deposit layer (20028) (Fig.19)



This deposit was in turn sealed by a patch of an ashy deposit (20027) concentrated in the southern area of the hearth. Sealing this ashy deposit was another hearth deposit layer (20026). This was a compound layer, as the actual hearth deposit was impossible to separate from the clay hearth floor that it sealed. Sealing this compound layer was another compound layer (20024). Similar to the previous hearth deposit, the actual charred deposit was incredibly ephemeral and was therefore grouped with the clay hearth floor that it sealed. In this instance, however, the re-flooring of the



Figure 3.11. Hearth Deposit (20028). Facing north. Photography: Katarzyna W. Harabasz

hearth was not limited to the scorched upper surface but extended to the rim and sides of the hearth. It is important to note that this re-flooring did not change the general shape of the hearth and any change in dimension was very slight. Sealing this layer was another compound hearth deposit and clay floor sequence (20023), which was in turn sealed by the latest scorched oven floor (18983). The latest oven render was sealed by a small patch of brick-like abandonment debris (20018) in the northeastern section and a more homogenous patch of room fill (18994) to the west. All of the aforementioned hearth deposits were prioritized and studied by specialists while on site. Generally, the hearth was deemed to have been scoured and cleaned often as the deposits turned out to be very sterile with very little evidence for fuel use. It is important to note that F.3436's earliest uncovered deposit seals the main sunken floor stratigraphically.

### ***Southern 'Dirty' floors***

The earliest deposit of the southern activity area that has been uncovered consists of a heterogeneous dirty floor in the southwestern corner of Sp.135, containing a small scoop measuring 0.22m by 0.18m and a depth of c.0.03m. The western and southern boundaries of this context are clear and are delimited by the western wall F.5036, the western portion of the southern partition wall F.5037, and the remains of the charred wooden threshold between Sp.135 and Sp.373. To the north, a clear boundary can also be seen between this deposit and the main sunken floor, although the exact stratigraphic relationship between these two depositional events is as of yet unclear. This floor was sealed by two distinct (and stratigraphically unrelated) deposits.

First, in the east, a visibly distinct, largely gray and ashy dirty floor seals this floor. This ashy dirty floor (unexcavated as of yet) is sealed by another patch of dirty floor (20038), which (as mentioned previously) also sealed the earliest hearth deposit uncovered. This layer (20038) was especially rich in phytoliths, as well as charcoal, and was accordingly sampled.

Second, in the west, this floor was sealed by two floor sequences (20014, 18999, 18998, 18996), which had only survived in small patches along the southern part of the western wall F.5036 and a compound floor sequence (18997), which had also only survived along the edge of the western wall,

approximately 0.45m north of the aforementioned floor sequences. While it is possible that these floor sequences may correlate, no stratigraphic relationship between the two survived archaeologically, except that both sets of contexts were sealed by a homogenous patch of remnant room fill (18994).

### **Space 373**

Because of safety concerns, the southern limit of excavation for B.80 was pushed further north. However, very little excavation took place in the small, southern room of B.80 this year, although we were able to see that the threshold (19804) predated the wall modification (measuring 0.44m) and stretched to the original extent of the doorway at 1.15m. Lastly, there are still no obvious internal features that have been revealed as of now.

### **Building 89 (Space 379)**

This season saw the continuation of work in B.89, Sp.379 (work began in this structure in the 2011 excavation season and has been on-going ever since). Here the team from UC Merced, California, began excavating the primary occupation sequence, whilst continuing to experiment with various techniques of digital data capture and recording, with a continued focus upon 3D and tablet technology in the field (see Ch 18, 3D Digging project).

The structure, situated in sequence directly under B.76 and is probably contemporaneous with 'Hodder Level' P. The building is a large square structure, the exposed limits of which are approximately 5.80m north-south by 5.20m east-west. In many ways the layout is fairly typical with platforms (complete with burial sequences) situated along the northern and eastern walls, hearths and dirty floors in the southern half of the central space, a possible partitioned storage zone on the western side of the structure and a number of post scars and retrieval pits. The southernmost end of structure extends below the southern limit of excavation in the shelter in order to meet health and safety requirements. This means that it is likely that key features of the structure (including the oven sequence, ladder scar and southeastern platform and any storage structures that might be situated against the southern wall, as seen elsewhere on the site) may never be exposed.

### **Space 379**

At the end of excavation the occupation sequence of B.89 remains incompletely excavated, however significant progress was made in several areas, with a strong focus upon a sequence of hearths in the southern part of the space and the platforms along the eastern wall. The earliest deposits identified (although not excavated) this season were both tied into these sequences. On the northeastern platform (F.3473) a thick makeup layer, (30921), was defined sealing the feature, c.1.00m by c.1.40m across. Although this unit was not excavated, it was significant since it was associated with the upper part of the subsequent burial sequence for the platform (apparently cut in at a height of between 1006.51-1006.41m ASL).

The first burial in the sequence (F.3479) was situated in an ovoid cut, (19891), c.1.00m by c.0.51m across. This lower burial was not fully excavated at the end of season, but had already yielded two clusters of secondary human bone, one comprising craniums: (30914), sealing another more general cluster of long bones: (30920). A primary burial has not been identified for this cut yet, but presumably these two clusters represent the preparation and movement of later burials to allow for

its deposition. The cut was filled with two fairly compact and homogenous brown silt fills, the lower, containing very small inclusions of plaster and charcoal flecks, was (30910), and the upper (19897), more greyish, yielded shell fragments, possibly related to some form of personal adornment.

Cutting through this earliest identified burial were a further two, the first (F.3478) was defined by a small ovoid cut (19880), c.0.32m long by 0.27m wide by c.0.33m deep, containing the skeleton of an infant (30900). Again the burial was sealed by two fills (19877) & (19874).

The final burial in this sequence, F.3481, was allocated the cut number: (19896) (c.0.35m in diameter by c.0.14m deep). Inside was yet another bone cluster (30913), which was a discrete concentration of disarticulated human bone (and a small shell ring) located on the south-east side of the cut. The primary burial itself (19887) was a fairly standard adult flexed inhumation and may represent the last undisturbed burial in the sequence. Again the cut had two fills of similar fairly homogenous silt (19886) & (19879). The burial sequence was finally sealed by a thick (40mm) compact white marl plaster (30908) (for a more in depth discussion of this burial sequence, see the Human Remains report in this volume).



Figure 3.12. Bench (F.3476) and east-central platform (F.3477). East facing photo. Photography: Elisa Blancifiori

To the immediate south of this platform, upon the east-central platform (F.3477), c.1.99m long (north-south) by c.1.64m wide, a compact mid yellow-brown silt makeup layer (as yet not fully excavated) was identified (30917); this was associated with another similar make-up layer on the western external face of the platform (30923), both of which were sealed by two apparently discrete layers of 30-40mm thick white 'marl' plaster (30912) & (30909). The southern edge of this platform was defined by a wide bench (F.3476), c.1.58m long by c.0.74m wide, from which two plasters and associated make up (Plaster: (30915) / Make-up: (30916) & Plaster: (30918) / Make-up: (30919) were removed respectively (to a total thickness of 130mm), exposing the earliest plaster in the bench sequence (currently not fully excavated), (30922). The highest plaster in this sequence was (30925), which although ostensibly was part of the bench (F.3476), also sealed the upper plaster on the east-central platform (F.3477).

This point in the development of the east-central platform was punctuated by the construction of a low brick bench (F.3475), approximately 0.30m wide, along the western edge of the platform. The brick components of this structure, (30904) and (30905), were sealed by a 40mm thick layer of light brown silty clay makeup (30906). The original

surface of this structure had apparently been scoured away. The function of this bench may simply have been aesthetic, to delimit the edge of the structure. A northern counterpart to this structure was also identified as F.3474, abutting the uppermost plaster of the northeastern platform (30908) (*see above*) and constructed as a plaster base (30907), supporting another mud-brick (30903).

Sealing both of these platforms were the severely truncated, or scoured, remains of central internal floors and surfaces related to the north central platform, (30902) & (30901), respectively. These units formed a thin band against the western face of the northeastern and east-central platforms representing a short sequence of bedded floors and make-up deposits 30mm deep, and were either scoured out in antiquity or during the removal of the structures internal deposits.



Figure 3.13. Detail of brick structure (F.3475). Facing North.  
Photography:Elisa Biancifiore

### ***Southern 'Dirty' Floors and Structured Hearth***

In the southern part of the exposed space work began on the dirty floors and hearth sequence that were visible to the north of the southern limit of excavation. In fact it was the structured hearth (F.3472) that effectively defined this sequence, since most of the dirty floors in the area were stratigraphically locked in to various builds (or phases) of this hearth. The earliest phase of the hearth identified was not fully excavated this season and it is clear that the sequence continues below the current occupation level. One charcoal fill was recorded and removed from this earliest incarnation, (30924). Sealing this fill was a compact clay plastered rim (19898), which formed a rounded square edge to the hearth (c.0.80m wide) with a circular concave base (c.0.62m diameter). The surface of the structure showed signs of being affected by heat and the centre contained a burnt clay infill (19892), possibly a repair because of heat damage (?). This in turn was sealed by a concentration of loose silt and charcoal (19890) at the centre of the hearth structure, associated with *in situ* burning.

The outside of this early rim structure was sealed on its northern side by a small patch of yellowish silty-clay floor, approximately 0.44m by 0.52m across and 8mm thick at a height of c.1006.30mASL. Similarly the hearth was sealed by a dirty floor, (19895), on its northern side which extended under





Figure 3.14. Lowest phase of structured hearth (F.3472). Facing North.  
Photography:Elisa Biancifiori

the southern limit of excavation (and was therefore not seen in its entirety). This was in turn cut by a shallow scoop (19894), filled by (19893) of unclear function.

Within the hearth itself, a third phase of use was marked by the construction of another plaster rim (19889), which by effectively filling the limits of the hearth began a process of development of the structure which made it concentrically smaller with each rebuild. This rim was approximately 0.77m across, with a working central

depression of c.0.64m diameter. On the whole the shape of the structure was much the same as its predecessor, although in this case a little more rounded. The depth of circular central depression was fairly shallow at about 40mm. This phase of the hearth contained a primary charcoal rich fill (19883), sealed by a clay patch (19884/19889 – repair?). This third phase rim was sealed by another patch of floor (19885), which spread some 0.72m to the east of the feature. This floor lay under the final make-up layer for the bench (19888) at the southern end of the eastern platforms (F.3476). This phase of hearth was also sealed by another dirty floor on the southern side (19881), which again extended below the southern limit of excavation.

The hearth sequence then continued uninterrupted through its final few phases of use. Firstly another charcoal rich deposit (19878), sealed by another plastered rim (19875), which only really survived along the northern edge of the structure. This was associated with a circular burnt clay surface inside the hearth (19876), c.0.51m in diameter. This was then sealed by yet another charcoal rich deposit (19873), before the final plastered rim (19872) and associated burnt plaster surface (19871) was constructed, marking the last clear phase of use before the building was closed. This phase of hearth was finally sealed in the centre by a final burnt charcoal rich deposit (19865). In its final incarnation the hearth was significantly smaller, with a diameter of 0.62m across; this may reflect the fact that it re-utilises the earlier rim structures as an external limit (at least in part).

At around this point stratigraphically all of the furniture along the eastern side of the space was sealed with a final thick white marl plaster, which marked the final layout of these features before the building was closed. The plaster was arbitrarily numbered according to the feature that sealed and was known variously as (19866), (19867), (19868), (19869) and (19870), and sealed the southern bench on the eastern side, the central-eastern platform and the northeastern platform, to a thickness of up to 30mm.

The latest units to be removed this season were the fills of four post-retrieval pits identified in plan in the 2012 excavation season: fill (19840) in cut (19839), fill (19842) in cut (19841), fill (19843) in cut (19844) and fill (19846) in cut (19837). Since the pits were defined last season there is little to add except that all of the fills were notably similar fairly compact, reddish brown sandy clay silt very frequent plaster, brick and charcoal fragment mottling. After excavation all of the pits averaged about 0.60m deep.

### Building 96 (Space 370)



Figure 3.15. Overview of B.96, Sp. 370. Facing North. Photography: Johanna M. Bergkvist

Work began upon the excavation of B.96 in the 2010 field season, when 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). The building is an L-shaped, broadly rectangular structure, with platforms along the eastern side. The southern half of the space will never be fully understood as it extends below the southern limit of excavation in order to fulfil

health & safety requirements. This year work continued upon the occupation sequence, begun in the 2012 excavation season by Justine Issavi, with a continued focus upon the floors and burials in the southern Sp.370.

### Space 370

The occupation in this room, excavated this season, was completely dominated by the burials that dominate the platform structures on the eastern side of the space. The burial sequence is extremely complex given the relatively confined appearance of the space itself. The earliest unit identified in the excavated sequence this year was a compound sequence of thick plaster floors and makeup material (20843 - all c.10mm thick) that remained *in situ* in the 'corner' formed by the northeast platform (F.3507) and the shallow pit adjacent to the crawl hole (20806, filled by (20801). This material (0.47m long by 0.34m wide by 100mm deep) was truncated by the pit itself, which is why it is truncated and was also associated stratigraphically with a similar unit (20839). This second group of floors and makeup represented at least five plastering events on top of the northeastern platform (F.3507), c.0.20m thick on the surface of the platform c.1.15m north-south by c.1.30m east-west.

Higher in the platform sequence these floors were sealed by further two plaster floors and their makeup (30831). The two groups of floors were split to allow the floor sequence to remain in phase with the other central floors and platform surfaces in the building. A further two white plaster

surfaces, (20826), followed by (20833) (equated to (20833) on the side of the platform), along with their associated makeup deposits (20829), (20838) & (20822), sealed the sequence and were excavated in order. These were truncated by the basket infant burial (F.7002) excavated in the platform in the 2012 excavation season – thus tying in stratigraphically with the upper part of the occupation sequence. As found elsewhere in the building (and indeed on the site) the plasters in this platform sequence were all characteristically sterile compact white marl and the makeup deposits all compact grey-brown silt, all very uniform and even in their distribution. This plaster sequence was linked, through the truncation of the side plaster (20814) by burial F.7007, to the burial sequence in the central-eastern platform (F.3508). The burials in this large platform were extensive (at least six were exposed or excavated this season, adding to a further three from the 2012 excavation sequence). In fact burial: F.7007, was not the earliest in the sequence. This was F.7011 at the southern end of the platform. This earliest burial truncated a short sequence of plaster surfaces on this platform (20841), (20840) & (20815) and their associated makeup deposits (20841) that were piecemeal in their extents (due to extreme truncation by the complicated burial sequence).

Working through the burial sequence in order, the earliest: F.7011 was defined by cut (20835), c.0.70m long (east-west) by c.0.40m wide and approximately 0.52m deep. The ovoid cut was badly truncated by later burials in the sequence and the individual (Sk.20832) was very tightly flexed and the cut was fill by (20836). The burial infill was finally sealed by a thick plaster cap (20834). Where the original limits of cut was clear (at the north end only due to truncation) it was obvious the this burial was sealed by two compact grey-brown silt makeup layers, (20813) and (20816), which were typically sterile – no obvious plaster surface was identified in association with this burial. Next in the burial sequence at the southern end of the platform was F.7010. The cut for this burial, (20828), was c.0.84m long (east-west) by c.0.44m wide and approximately 0.54m deep. Inside the skeleton (Sk.20830) was another tightly flexed individual, there is some basis from the osteological and stratigraphic interpretation to suggest that this burial may have been a secondary deposition. The cut was filled with sterile silt (20827) which resembled the underlying room fill/platform superstructure through which it was cut.

At this stratigraphic level in the northern end of the central-eastern platform (and as noted above, truncating the plaster on the edge of the northeastern platform: (10814) was a sequence of three very closely connected burials: F.7007, F.7012 (the former incompletely excavated, the latter identified but as yet untouched) and F.7008. The two earliest burials in this sequence remain to be completed, although the earliest F.7007 has a defined cut (20821) and partially excavated fill (20818), the skeleton – as yet unnumbered – remains in situ and covered for excavation next season due to time constraints.

The latest burial in this immediate sequence, F.7008, was defined by a cut (28025) that was c.0.76m long (east-west) by c.0.42m wide and approximately 0.24m deep. The flexed inhumation (Sk.20824) was not notable from the perspective of its excavation, apart from the fact that infant bones were found under the upper thoracic region the left hand. The cut was finally filled by typically sterile silt, (20823).

The latest sequence of burials identified in this south-central platform was identified as F.7003 and comprised a sub-circular cut, (20811), which was c.0.68m wide by 0.56m wide and up to 0.33m deep. The skeleton, (20810), was very tightly flexed and pushed against the sides of the cut, there was some evidence of phytoliths associated with the body, and an obsidian flake was found in the fill (20809) close to the forehead, 20809.X1. Some fragments of juvenile cranium were also found in the fill, 20809.X2. Sealing the fill was three obvious and discrete caps of thick (c.30mm) plaster surfaces, (20808), (20804) & (20802/19717) defined in 2012 excavation season. The latter two of these were associated with discrete make-up deposits (20805 & (20803 respectively). These units were presumably associated either with attempts to reconstitute the platform surface after various burials, or perhaps represent efforts to compensate for later compression of the burial fill. Either way the surface (20802/19717) represents the latest unit excavated in the season in this building this season and the tie in with previous seasons work.

### **Building 97 (Spaces 503 & 160)**

Building 97 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 where it was left in the 2012 excavation season, in an effort to excavate 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 Ch. 20, Modeling Chronology).

Over the course of the 2012 season it has gradually become clear that the broadly square upper phases of this structure give way in the earlier parts of the sequence to a L-Shaped space in the south, and the Space 160, Shrine 10 Annex in the north [to be confirmed by future excavation?], However both of these earlier divisions of space appear to respect the same external walls, suggesting modification and change of use of one overall structure sometime around 'Hodder' Level P/O (Mellaart Level VI/VII). Although the precise structural development of these spaces cannot be determined until the excavation is complete in future seasons.

### **2013 Excavations**

In fact excavations in this structure were limited this season, due to changes in excavation priorities mid season the operation was postponed mid season. As such two specific areas were targeted. The first being the remaining fills and deposits in the main building area, within the boundaries of the underlying architecture (perhaps associated with Sp.160, see note below), and to its south in what has been defined as the L-Shaped Sp.503. The second area targeted was the remaining midden and floor material left *in situ* in the southeastern corner of the upper spaces, possibly associated with an early oven and unusual niche structure.

### **Space 503**

For the most part in Space 503 excavated deposits constituted homogenous compact silty infill material, such as (20381), which was approximately 100mm thick in the southern portion of the space. An ephemeral plaster layer (20380), and another heavier make-up deposit (20362) that



essentially covered the whole space sealed this deposit, apparently marking the transition between the earlier and later room layouts.

In the southeast corner of the building some work continued on the niche (which was begun in 2010). However this too was not completely excavated this season. The earliest deposit removed (20385) was a compact silty make-up layer that was only partially completed. Sealing this was a thin (15mm thick) burnt dumped layer (20384), which was in turn sealed by another make-up deposit (20383). This formed a level foundation for a white plaster surface (20382), which appeared to mark a later phase of use of the niche at c.1006.55mASL. Indeed it became clear as these deposits were removed that the niche appeared to have functioned across a number of phases of activity within the building (some of which are yet to be understood after excavation is completed). The latest deposit in this sequence to be excavated this season was a thick band of midden material (with a very high yield of animal bones) that filled the niche prior to it being walled off (20379). This essentially corresponds to material which was removed in previous seasons (units (19245) & (18634) perhaps?).

### **Space 160**

Finally to the north in the underlying Space 160 a further room fill was excavated, continuing from those removed in the 2012 excavation season (20375). This was essentially a mid grey compact silty clay, yielding very occasional bone, shell and obsidian.

### **Concluding Notes**

Building 97 is almost complete; although there remains work to be done within the building in order to fully understand its stratigraphic relationships with underlying earlier structures, specifically Sp.160. The building has been paused in a different use and configuration of the space within the walls of B.97, and quite how the dynamics of this earliest spatial configuration works will not be clear until the building and its phasing is fully understood. That said it seems likely that the partially excavated space in the northwestern part of the building is probably the remains of the earlier SP.160 poking through from below, but currently it is unclear how the spaces infill relates to any possible crawl hole in its northern side.

### **Building 118 (Space 510)**

B.118 (previously called House 25 by Mellaart and identified by him as a Level XII structure) was located to the immediate north of B.43. Initially it was targeted by Mellaart as a potential point at which he might expose earliest architecture in his sequence, after his failure to do so in his deep sounding in 1964. However the exposure of House 25, Level XII in 1965 was as far as he got in this aim, because he never returned to the site after that season.

This structure turned out to have been affected considerably by the 1960's excavation and its subsequent exposure, and in the north side of the structure almost none of the floors and original features survived. To the south of the structure preservation was better, and it turns out that many of the features (including an oven, platform, hearth and bins) remained fairly well preserved (in some cases even running under the southern section).



Figure 3.16. 3D model of B.118. Model: Jason Quinlan



Figure 3.17. Overview of B.118, Sp.510. Facing east.  
Photography: Kierstyn Smith

The building was re-cleaned and recorded in the 1994/5 seasons, by members of the current project, although no further excavation took place at this time. A single auger hole was placed drilled through the centre of the structure during these seasons, revealing considerable depth of anthropogenic material (up to 4m including two possible underlying marl plaster surfaces). This season, the building was reopened, and cleaned with a view towards excavating it fully. The aim like Mellaart before was to establish the presence, or not, of earlier architecture below in order to increase our overall understanding of the earliest structural remains of the site and their associated material culture – of which there has been little or no exposure.

B.118 was also part of the pilot project, aimed at digitizing the on-site planning process. Using the latest tablet technology from Microsoft, the ArcGIS software suite and site Photography equipment all graphic representations of the archaeology were digitally created and archived (For report and workflow, see Ch. 23).

## Underlying Architecture



Figure 3.18. Detail of sondage in Sp.510, showing underlying architecture (walls F.7209 & F.7210). Facing north. Photography: James S. Taylor

In order to establish the presence, or otherwise of early architecture, it was necessary to expose some archaeological deposits beneath the main B.118 structure. At a certain point the scouring and erosion in the north of Space 510 (Sp.510), allowed us to excavate a small targeted trench to establish the presence, or otherwise of earlier architecture beneath the structure.

Within this test trench the earliest features to be identified were a pair of walls (aligned in the conventional double wall arrangement with no apparent between wall fill), F.7209

and F.7210. Clearly the walls were not fully exposed, only 4-5 courses of the southern wall, F.7210, were visible in the sondage, to a height of c.0.33m. The total visible length of the walls was c.3.21m, however they clearly extend underneath the overlying walls of B.118, which is set at a slightly different alignment to this earlier architecture. Unusually the mortar was a mid-dark grey brown slightly clay silt, whilst the bricks were a light whitish-grey marl-like material, resembling wall plaster.

The north face of the southern wall F.7210 was sealed in the sondage on its southern exposed side by a dense grey-brown silt, which resembled 'conventional' 'building in-fill' seen elsewhere on the site, (30631). The deposit was fairly homogenous, with no horizontal laminations (floors or such like). It did however include some plaster lumps and flecks, which were aligned to suggest that they had been laid as tips. The base of this deposit was not reached at a level of c.1003.83m ASL, some 0.33m deep. However it is worth noting that an augur hole dating to the 1994/'95 season indicated the presence of a possible plaster surface approximately c.1.00m below the existing surface of this deposit (c.1004.06m ASL), with another c.1.00m below that, as well as a further 4.00m of cultural material below this, which brings the total depth of anthropogenic material in line with that in the deep sounding.

Immediately sealing the tops of the walls (and not related stratigraphically to the room fill, (30631) was a short sequence of 'linear' deposits that were actually excavated as part of the overlying Sp.510, as they were originally thought to be room furniture along the northern wall of this space. However with hindsight and an understanding of the two earlier walls, it became clear that these deposits were almost certainly the uppermost structural components of these early walls (bricks and mortar), which had been disturbed and degraded during previous excavations and their subsequent exposure. The sequence included three probable mortar courses: (30623), (30642) & (30643); and two patches of brick: (30624) & (30638). For the most part these extended along the length of the visible extents of the walls – respecting their width, and brought the highest elevation



on the top of the wall to c.1004.27m ASL, making the walls approximately 0.44m in its current exposure. The poor state of these courses and the pale 'marliness' of the brick components (resembling *in situ* plaster) is the reason these elements were initially mistaken for benches or degraded platforms.

### Space 510

Most of the excavated units in this sequence, which can be definitely attributed to Building 118, belonged to a number of features (room furniture: ovens, hearths, platforms, etc.) located for the most part around the eastern and southern part of Sp.510, as it was exposed by the current southern limit of excavation. However stratigraphically the earliest deposit found in space was c.50mm thick grey-brown clay-silt make up layer (30614), to which adhered some very patchy residual marl plaster surface (so badly degraded that it was not numbered separately), at a height of c.1004.10m ASL.

This deposit covered an area of c.3.91m by c.2.07m (orientated northwest-southeast) in the central, northern and western parts of the space, to the west of a plaster partition or sunken plaster, but did not extend to the limits of B.118 (with hindsight this may indicate that it too belongs to the sequence associated with the lower architecture – although probably not the residual plaster – however this will not become clear until the proper limits of the structure are identified in future seasons.

This deposit was sealed on its southern side by one of the make-up layers (30610), of a platform sequence (F.7203), which dominated the southeastern portion of the space. In fact the lowest identifiable stratigraphic unit in the platform sequence, a dark grey-brown, 'greasy' feeling, clay-rich silt surface (30645), was in itself one of the earliest deposits excavated in the room. This surface effectively defined the area within which the rest of the platform built up, although at the end of the 2013 field season it is impossible to say whether any more deposits associated with the construction and make-up of this feature lay beneath it as the sequence was not fully excavated.



Figure 3.19. Detail of curb (30647) and oven (F.7202) in the southwestern corner of Sp.510. North facing photo. Photography: James S. Taylor

Sealing this earliest floor was a shallow 'curb' (30647), which curved around to possible respect an oven in the southwest corner of the space (F.7202 – see below). The curb was approximately 1.70m long (east-west) by 0.20m wide, and stood no more than 50mm high. For the most part the curb defined the northern limit of the platform; almost all other units that made up the structure respected it. The southern limit of the platform was not visible as the feature extended below the southern limit of excavation.

Sealing the curb was a sequence of



make-up deposits and plaster surfaces that represented the various use phases of the feature. Most of the floors were removed as part of the make-up that they were associated with, since they were so patchy and ephemeral that it was difficult to split them. The sequence included the following units: (30641), (30639), (30621), (30636), (30635), (30634) (30617). The last grey brown make-up layer in this bench feature (30605), also sealed the central make-up and patchy floor (30614: see above), and was finally sealed by another very patchy layer of white surface plaster (30603), which marked the top of the platform at c.1004.17m ASL, some 0.20m high.

To the immediate west of the platform (F.7203) was an oven (F.7202), which respected the curb of the platform (although it is hard to ascertain which was earliest stratigraphically at the time of writing). The superstructure (30640) was its earliest component (at the phase of excavation in which it was left at the end of the 2013 excavation season) and remains *in situ*. The oven formed a typical horseshoe shape c.0.79m wide (northwest-southeast); the length of the oven however remained unclear, since it extended from the southern limit of excavation (0.55m was exposed during this seasons excavation). The superstructure survived to a height of approximately 50mm, although it was slightly lower at the front (northern) end, possibly suggesting where the mouth of the oven was.

The outside of the oven was plastered at some point with a fine white plaster (30646), which functioned with the curb (30647) and earliest floor (30645) of the platform (F.7203). The inside of the oven, contained at least two baked oven floor surfaces (30632) & (30633), approximately 30mm



Figure 3.20. Detail of clay ball cluster (30630) against oven (F.7202), and dirty floors (30652) to the north. South facing photo Photography: Onur Yüksel

thick, although it seems likely that there may be further surfaces to be excavated. The northern limits of the oven had a clear relationship with a large 'dirty' floor deposit (30652), which extended to the northern side of the room (some 2.56m north-south by c.1.78m east-west). The southern side of this floor appeared to be darker and contain more charcoal, suggesting that perhaps it was associated with rake-out activity from the oven. Also associated with the oven was a distinct cluster of four clay balls, both whole and fragmented (30630), which lay adjacent to the western side of the mouth directly upon this dirty floor.

A small (90mm diameter) scoop (30620) of unknown function was also cut into the northern part of this dirty floor (in the northwest corner of the space). The fill of this scoop (30619) was soft grey silt, with charcoal flecks and was very distinct from the material that was cut by the scoop. Sealing the southern part of the dirty floor was a more formal plaster surface (30650), which was c.1.46m north-south by c.1.32m east-west at a level of c.1004.08m ASL. This surface appeared delimit an area associated with a bin at the western end of the space (F.7201) and a platform that abutted the northern wall, to the west of centre (F.7211). This area, utilising these features as a boundary was



Figure 3.21. Detail of bin (F.7201). West facing photo. Photography: Onur Yüksel

subsequently filled with another short sequence of 'dirty floors' (less than 0.05m thick), (30615, which sealed the underlying plaster surface.

The bin was comprised of two component units: superstructure (30651) and a white plaster surface (30644/30648). The bin itself was c.0.63m long (east-west) by c.0.63m wide, and the walls (which were scoured almost to the floor of the bin itself) were c.90mm wide. The

bin itself was sterile and had no *in situ* fill. The northern platform (F.7211) was a simple construction consisting of a coarse white plaster make-up (30649), sealed by a finer plaster surface (30609). This structure was square, being up to 0.93m wide in each direction, by 160mm high. At c.1004.24m ASL, and the bin surface at c.1004.17, both of these features were raised slightly above the southern plastered floor (30650) with which they were clearly associated.

On the immediate east of the southern platform (F.7203), also running under the southern limit of excavation in the space was a small structured hearth (F.7205), at least 0.71m in diameter. This hearth remains incompletely excavated at the end of the field season, having had two burnt fills removed from its centre (30637) & (30601), and as well as running under the southern section of the space, interacting with (apparently running under) an early phase of the bench (F.7203) discussed above.

Also on the southern side of the space, in the southwest corner, again extending below the southern limit of excavation, was a compound layer consisting of a sequence of 'greasy' feeling clay rich plaster surfaces (30608) that formed a gently 'ramp', F.7204 (sloping from east to west from the corner). This deposit was group because the surfaces were badly damaged (presumably because they had been exposed in previous seasons), and did not clearly interact with anything around them stratigraphically. The feature was approximately 2.03m long, but was only exposed up to 0.60m east-west because of its location next to the southern limit of excavation.

To the immediate north of this was a possible bench (F.7212), which appeared to abut the eastern wall of the space. This feature essentially consisted of two layers of makeup (30627) & (30628) forming an approximate rectangle, c.1.34m long (north-south) by c.0.45m wide. Only ephemeral traces of plaster were found associated with these deposits, and the bench was not very well preserved. With hindsight, given that they may respect the earlier architecture detailed above, it is



Figure 3.21. Detail of hearth (F.7205). South facing photo. Photography: Onur Yüksel

possible that this feature may not in fact be a bench, but a southern return of the early walls. However this could not be ascertained for sure without further work.

#### Abandonment and post-abandonment

Inside the oven (F.7202), situated in the southwest corner was finally filled with a deposit consisting of a burnt, ash-rich silt (30629), which was clearly *in situ* as it supported baked fragments of the oven superstructure (collapsed wall and ceiling).

Elsewhere evidence for the Neolithic abandonment of structure was fairly ephemeral. Mellaart probably scoured this out when he first uncovered the building during his 1960's excavation campaign. Consequently the presence of *in situ* Neolithic room fill was patchy at best. The greatest expanse of actual room fill associated with the closure of the structure, was in the southwest corner of the space where a large block of material (30626) & (30622) was removed in an attempt to expose the southwestern corner of the space (exposing oven F.7202), and get some idea of the true extents of the space beyond the southern limits of excavation. The removed material formed a rectangle c.1.80m east-west by c.0.85m north-south (some 0.46m thick) and consisted of more or less homogenous, and fairly sterile mid grey brown silt; there was some evidence of tipping mainly indicated by variation in colour.

This material was probably associated with another Neolithic deposit in the western part of the space (30602). This was a thin (up to 50mm thick) deposit that sealed the dirty floor sequence and bin F.7201 against the western wall of the space. It was defined by the slightly lower surface in this end of the space, forming an area up to 1.36m wide (east-west) by c.2.34m long (north-south). This material was very mottled homogenous silt while was all but sterile of material culture. However there was clear evidence of brick and pale white plaster fragments. It seems likely that this deposit was a residual layer of primary demolition of the structure, suggesting a fairly 'conventional' closure sequence. To the immediate east of this was a small patch of collapsed plaster debris, (30613 (c.1.57m north-south by c.0.70m east-west). Whilst the eastern side of this deposit was irregular, the western limit of this deposit was straight (north-south orientated) and aligned along the edge of the residual room fill (30602), it also coincided with the eastern limit of the platform (F.7211), hinting at the possibility of a partition or change in spatial zoning here. This was further reinforced by the presence of a c.0.43m diameter post retrieval pit cut (30612), filled by (30611) against the northern wall, in line with this division.

In the northeastern corner of the space was some heavily disturbed and truncated material that was interpreted as residual Neolithic room fill, (30618) and (30606). Presumably this material was left *in situ* in the corners, when Mellaart truncated the main deposit in the centre of the room through

excavation. These deposits were sealed by a band of dark clay-rich silt, which ran along the northern limits of the space (30616). This was interpreted as mudbrick collapse or disturbed/degraded brick material, a process that may relate taphonomically to exposure by excavation in the 1960's.

In terms of clearly identifiable post-abandonment features, it became evident fairly early on that a unit number needed to be attributed to James Mellaart's actual excavation (30607), which was effectively an irregular cut which accounts for the varying levels of preservation of features and internal fills of B.118. Critically it was important to define this as a unit, because of the way that walls were preserved. The topmost c.0.40m of the northern and eastern walls of Sp.510 were truncated very obliquely in the vertical plane by Mellaart's excavation, suggesting a fairly aggressive level of prospection in this intervention. Furthermore, these early excavations did not uncover the southern part of the space, and so the southern limits of this 'cut' was essentially the section recorded in detail by the current team in 1993-5 seasons.

Inside the cut two further units were allocated, one to debris in the base of the cut and against the sides, which was more compact than the main body of the fill of the space (30604) interpreted as being Mellaart's original backfill. The second, (30600), was a number allocated to the 1990's backfill of the current project which formed the overwhelming majority of the fill removed at the beginning of the season. This number was essentially allocated to track the few unstratified finds retrieved during the operation to remove this backfill.

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2010 Excavations in the South Area: Building 80. Çatalhöyük Research Project, Çatalhöyük 2010 Archive Report.



#### 4. The excavations of the TPC Area in the 2013 season

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Last year's season brought about the beginning of 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. 4.1). This new excavation zone was named the TP Connection Area (TPC). The ultimate goal of this new 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 the 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) (see more Marciniak *et al.* 2012).

Works in the early levels of the settlement in the South Area revealed that the neighbourhood community was a major organizing principle of society in the classic phase of mound occupation. 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; Özdoğan and Özdoğan 1998), 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 the 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 of the East mound in the TP Area.

Excavation results from the upper Late Neolithic strata (c. 6300 – 6000 cal BC) in the TP Area, 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). The inhabitants began to control storage and production. The overall context of the process, its mechanisms, pace, and consequences have not been investigated to date.

Excavations in the TPC Area are carried out in four new trenches. Trench 1 is 5 x 5 m and is located directly to the south of the Mellaart Area A. Trench 2 is placed directly south of Trench 1 and its overall dimension is 5 x 6 m. Trench 3 is located in the southern part of TPC Area, 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;

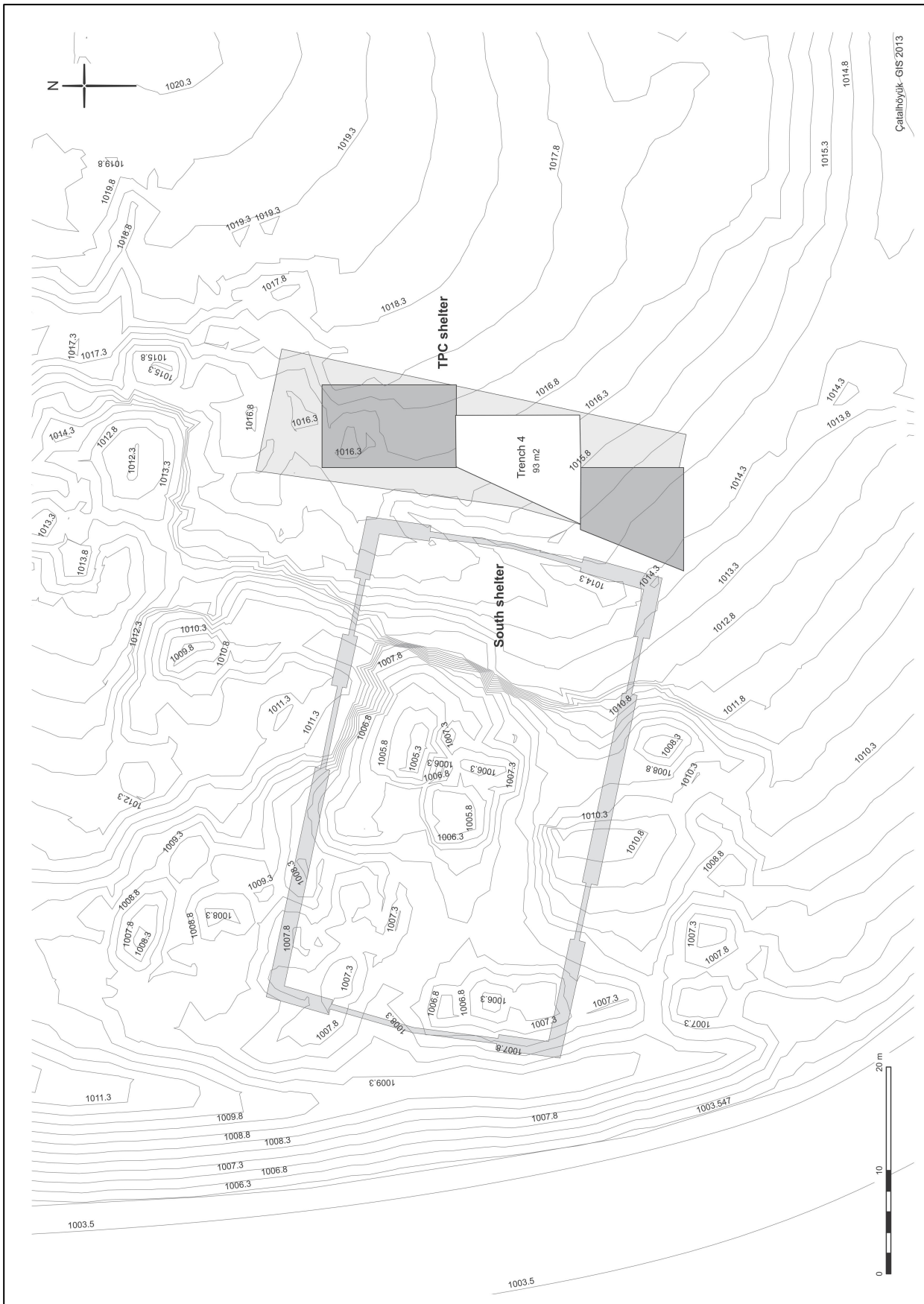


Figure 4.1. The extent of the TPC trenches. Plan: Camilla Mazzucato

Regan 2004). It is quadrilateral in shape with southern and eastern edges being 10 m long and the northern edge measuring 6 m in length. Trench 4, measuring ca. 8 x 6 m and is located in between these two sections of TPC Area. The works in the first two excavation seasons were carried out in Trenches 1 & 2 and 3, while Trench 4 will only be excavated in the coming years.

The excavations carried out in the past two seasons made it possible to reveal a sequence of Neolithic buildings and features in all three excavated trenches in addition to numerous post-Neolithic deposits. Altogether, remains of four Neolithic buildings in trenches 1 & 2, and two in trench 3, have been revealed to date. In the former contexts the two uppermost structures – B. 109 and 115 have been badly destroyed, while earlier B. 110 and 121 are considerably well preserved. Neolithic buildings B. 122 and Sp. 520 from Trench 3 are preserved in a relatively good shape.

## Results of the excavations in Trenches 1 & 2

### The Neolithic sequence



Figure 4.2. 3D model of B. 121. Model: Jason Quinlan

Since Trenches 1 & 2 are connected, and different structures are placed in both of them, it is justified to discuss the results of this year's works in one section. The works in the past two seasons made it possible to reveal and analyze a distinct and coherent sequence of a number of superimposed Neolithic houses and adjacent features and layers possible.

The oldest structure discovered to date in this part of the TPC Area is Building 121 (Fig. 4.2). It is a relatively large structure with a suite of in-built structures and complex history of occupation. As the works in this building have not yet been completed, only a tentative interpretation of the discovered deposits is possible at this point. This is further complicated as the building is only partly preserved as it has been badly truncated by later occupation activities. As indicated by one

radiocarbon date from the in-built hearth available at present, the building is dated back to ca. 6400-62250 cal BC.

Only two walls of the building are placed in Trench 2, while the remaining two are located outside its perimeters, the western one probably very close beyond the edge of the trench. The eastern and



Figure 4.3. The painted eastern wall of B.121. Photography: Jason Quinlan

northern walls were identified and exposed. The eastern wall (F. 7160) has been plastered and painted. Black and white geometric designs, in the form of vertical and transverse sets of parallel lines, were identified, uncovered and protected (Fig. 4.3). The northern wall (F. 7187) was also plastered and painted, probably throughout its entire length. However, the character of the decoration remains unknown: the wall was almost completely torn down by the large post-Neolithic truncation (Space 507), which destroyed a large section of the Neolithic deposits between Trench 1 and 2 (see below). Numerous fragments of plaster and paint found in the W part of the building may indicate that the western wall might have also been painted.

A sequence made of floor, three subsequently built platforms, hearth and bin has already been revealed but left largely unexcavated in the current excavation season. The floor was solidly made and easily distinguishable. The color and fabric seem to imply its division onto the northern 'clean' (30861) and southern 'dirty' (30818) parts, the pattern typical for the classic phase of the settlement occupation. This distinction is further corroborated by the character of deposits placed directly on the floor. The 'dirty' infill (30858) from the south, as compared with its northern 'clean' counterpart (30805, 30821), contained a large amount of phytoliths: possibly the remains of reeds which had been strewn on the floor. This deposit was also particularly rich in charcoal. Several features on the floor of B. 121 have been identified and recorded. A relatively large fire installation (F.7250) was placed in its center. It is rectangular in shape and had thick, raised and



plastered walls. It is the only feature of B. 121 that was partially excavated in the 2013 season. Its infill was made of two distinct layers. The one to the east was composed of a number of burnt striations, full of phytoliths, seeds, charcoal and dung (30842). At the same time, its western part comprised of layered brown and partly burnt layer (30843). Its stratigraphical position in relation to the building use is currently uncertain. However, the hearth seems to be sitting on the yet another layer of older floor which is visible in the section of one of the later pits (F. 7189). Another interesting feature exposed on the floor of B. 121 is a small circular bin with plastered, concave walls (F. 7193) placed directly against its northern wall (F. 7187).

Altogether, five platforms were identified and exposed in different parts of the building. They were not contemporaneous and are indicative of subsequent reconstructions of its space. Three platforms (F.7192, F.7251, & F.7254) are placed in the eastern part of B. 121, while the remaining two (F. 7258 & F. 7259) in its western section. The latter are poorly preserved due to a significant destruction by the later pit cut (F. 7189).

The first three platforms were built against the eastern wall of the building with impressive geometric painting (F. 7160). The platform in the NE corner of the Building (F. 7192) is the most distinct, solidly constructed, well preserved and has a plastered whitish surface. It has also a shallow but distinct depression that is probably indicative of burials. Further to the south was another platform (F.7251). It was badly destroyed and only its small southern section got preserved. The cut has already been recognized at the top infill layer, which implies it was made after the building was abandoned and its interior backfilled. However, it has to be noticed that the cut was clearly discernible in the subsequent to infill layers. In any case, this was certainly a deliberate truncation, which character is difficult to specify. It may have been linked to the skull retrieving practice. A small pit was dug onto the platform (F. 7251) abutting the building's eastern wall. It has not yet been excavated. It appears to be a posthole placed against the richly decorated wall with geometric motifs. Its location is quite uncommon as it is placed on the platform and abuts the most decorative wall.

The third platform (F.7254) in the eastern part of B. 121 was placed between the truncated platform (F. 7251) from the south and later platform in NE corner of the Building (F. 7192). It was clearly built after platform F. 7251 got truncated. More likely, it was deliberately constructed in the place in which the older platform F. 7251 was placed. Hence, it is probably not surprising that it looks different than the two adjacent and later platforms (F. 7251 & F. 7192). It appears to be built on a make up, itself made of small stones/pebbles. The surface is very thin and was only preserved in small fragments/patches. Overall, this kind of construction is reminiscent of a floor, similar to B61 and B81 in the TP Area (Marciniak & Czerniak 2012).

Building 121 was probably deliberately abandoned and backfilled. This is indicated by its standing walls as well as a sequence of fill layers deposited directly on its floor (Space 514). A large antler was found in one of them (30779), in a close proximity to the plastered northern wall. It was probably an element of the building decorations, which was dismantled during its deliberate abandonment. Interestingly, shortly after its abandonment, the building was possibly temporarily used as indicated by the presence of a fire spot and two adjacent pits of unspecified character placed firmly in the building fill.

The large part of Trench 2 was considerably destroyed following the abandonment of B. 121 (see below). Probably already in the Neolithic (as implied by a lack of late pottery), its western and southern parts of B. 121 were destroyed by two pits: F. 7255 – from the south and F. 7189 – from the west. The very NE corner of B. 121 was also destroyed by a small and deep pit (F.7169). In the following period, the SE corner of the Building was further destroyed by a large pre-Hellenistic truncation, located against E edge of the trench. Building 121 was then badly destroyed after the end of the Neolithic, as manifested by huge deliberate cuts (Space 507 & 516) (see below). A large E-W truncation (Space 507) probably cut down a fragment of the mound from its top to the West. It happened in before the Hellenistic period as both Hellenistic pits and all the early Islamic burials were cut into it.

Despite these significant destructions, an undisturbed Neolithic and post-Neolithic sequence was preserved in the SE corner of Trench 2 (Space 506). It had c. 2 m<sup>2</sup> within the trench and it was made of a number of superimposed layers and features. Interestingly, it appears to be placed directly on the top of layer than destroyed southern part of wall 7160 of B. 121 (Space 514). It indicates that it postdates this truncation and all the layers in it.

The sequence appears to have been deposited against the N-S wall (F.3972). It is made of yellowish brown bricks and both its stratigraphic position and chronology is unclear at this point. The sequence begins by a solidly made floor (F.3996). A large cluster of barley (30252) was deposited directly on the floor. It may have originated from a broken storage jar, as numerous sherds were found in direct proximity to it. A layered heterogeneous infill (30264) was found on the floor indicating its slow deposition. The following feature comprised a fire installation (F.3990), built above the floor infill. It is a solid construction made of an interesting block of clay comprising a bottom of the hearth. It contains a lot of soot, ash and charcoal. A small earring made from electrum (a gold alloy) was found in hearth. This feature clearly post-dates the Neolithic and has nothing to do with the Neolithic (?) wall and the associated floor.

A small fragment of undisturbed and homogenous midden was also identified in SW corner of Trench (30773 & 30774). Its stratigraphic position is not clear as it was badly destroyed by the post-Neolithic truncation. In any case, however, it is later than B. 121.

The following Neolithic structure in this part of the TPC Area is Building 110. Its preserved dimension was c. 8 by 6 m. Its walls (northern, eastern and southern) were made of solid yellow/sandish bricks. Its eastern wall (F. 3910) was constructed through a previously prepared foundation cut, a practice recognized also in the TP Area. It may imply some kind of deliberate constructional practice in the late levels. The Building was divided into two rooms by the E-W partition wall (southern - Space 486 & northern – Space 485) (see Marciniak at al. 2012).

While stratigraphic situation in Space 486 is pretty straightforward with numerous infill layers placed on top of the other, more a complicated situation was revealed in adjacent Space 485. Both rooms were filled with a rather homogenous sequence of deposits composed of small striations indicating its long and continuous accumulation. Altogether, c. 1.30 meters of deposits has been lifted. Different infill layers were distinguished based upon color and consistency of soil. Some of

them were more homogeneous, grayish layers made of silty sand, while other more heterogeneous with a mixture of silty sand and fragment of broken bricks, floors and other constructional material as well as charcoal, pottery and animal bones (mainly sheep/goat and cattle). A fragment of articulated cattle spine was also revealed, which indicates a kind of deliberate deposition. Broken bricks may have originated from the collapsed wall as they were identical with bricks making up the walls of B.110. The bricky material is yellow, orangish and it is very sandy. Moreover, fragments of a distinct floor were also found in Space 486 (see u. 30205). Its surface was pretty clear and distinct while the make up was made of little pebbles and charcoal. Interestingly, these pebbles were not white, which makes them different from distinct floor in B. 61 and B.81 in TP Area (Marciniak, Czerniak 2012). In any case, the floor fragments indicate truncation and destruction of one of the adjacent buildings. They may either originate from B.109 or other building chronologically contemporaneous to B. 109 or B.115. It is rather unlikely that this floor was a part of destroyed B.115. The floor of this building was thin and fine with numerous re-plasterings (see Marciniak at al. 2012).

At the bottom of the excavated sequence in Space 486, a layer of irregularly placed bricks were located against its northern and eastern walls. They have a form of a pile of bricks of unspecified character. Interestingly, they have been put in the place where platforms of the Neolithic building exist. The role and function of these bricks is unknown, it is also unclear where there is floor anyway close. No floor of the building was reached this season. As indicated by the character of walls and elements of constructional practices, the Building was probably contemporary to B.74 from the TP Area, which means it can be dated to TP-N (see Marciniak & Czerniak 2012).

Stratigraphic relations in Space 485 of B. 110 are not clear, despite the fact that we excavated infill of what defined Space 485 and deposited against northern wall of B.110. A row of five bricks, most likely originating from the earlier wall, was revealed in the western part of Space 485, against southern and northern walls of what was believed to be the walls of the Space. Interestingly, it did not continue further to the east and it may have either been truncated or it is a part of rather shorter building. They were later truncated twice that led to the destruction of the upper course of bricks of these walls. As works in this area have not yet been completed, no further details of this complex stratigraphic sequence are available at this point. Additionally, walls in the northern and eastern part of the Space disappeared at a certain level. It implies that the northern sections of the northern (F. 3911) and eastern (F.3910) walls of B.110 appear to be built on infill. At the same time, the wall between Spaces 485 and 486 at these levels seems to be continuing. If this interpretation is correct, it is clear that the floor of Space 485 either did not exist or was completely destroyed. Hence, it cannot be ruled out that the southern and western walls may have served both B.110 and its lower predecessor. Alternatively, we may encounter here the later reconstruction of B.110 and the floor from its first phase of use is yet to be found. The stratigraphy in the Space will only be clarified when the walls of what was defined as Space 485 be lifted.

In the layer of midden (20255) between N wall of Building 110 and southern wall of the adjacent Building, not yet 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 have been deposited after both walls were

constructed. This is a deliberate deposit of ritual character dated to the period of ca. 6350-6220 cal. BC.

As revealed in the 2012 excavation season (see more Marciniak et al. 2012), following the abandonment of Building 110, the area went out of use for some time. It was later occupied in the form of some kind of open space. Its surface is marked by a solidly made bricky layer (20234) with fragments of a tramped floor (20256). After some time, the activity area went out of use and this area was used as a midden (20232 & 20215). 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. This is further corroborated by the fact that B. 110 and B. 74 seems to be contemporary.

A small fragment of *in situ* occupation activities was found directly above the open space and superimposed midden. However, considering a distinct character of the recognized features and despite the fact that it was badly destroyed from all sides, it justified to attribute them to a separate Building 115 (Space 491). The only preserved fragment comprises a kind of unspecified platform. It is made of a number of superimposed and distinct layers. The sequence was built on a layer of bricks placed directly on the midden (20213) followed by make up layer made of small pebbles (20207). The floor itself had a whitish plastered surface. This construction is almost identical to the floor of B. 61 in the TP Area, the latest in the sequence. The 'platform's' western and southern face was lined from outside by a homogeneous silty layer (20198), similar to mortar or plaster. 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. As it was only preserved in very small fragments, no details of its construction and layout are available.

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 indirect predecessor. 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. This Building is possibly contemporaneous with the latest B. 61 from the TP Area and can be tentatively dated to the Level TP.R. This is a tentative conclusion as not a single feature, which may unquestionably be linked to this Building, was found.

### **The post-Neolithic destructions**

The excavations in Trench 1 & 2 make it possible to identify a sequence of depositional events following the end of the Neolithic. The first element of this destruction comprised some kind of yet unspecified removal of western wall of B.121. On its ruins, three solid ovens (F. 3955, 7181, 7190) were built that most likely belong to some kind of activity zone placed the west of B.121 and beyond the western edge of excavated area (Space 519). Hence, its character is difficult to specify but it may either be a part of the building or be placed in an open area. In any case, the stratigraphic position of all three ovens makes it clear that they were built when both B.110 and B.121 went out of use.



The earliest in the sequence is oven F. 3955 (Fig. 4.4). Its construction led to the destruction of western sections of the southern wall of B.110 and northern wall of B.121. Approximately only 50 per cent of the oven was found within the trench. Despite the fact that its significant western part is located beyond the western edge of Trench 2 and hence it was only partly excavated, it is clear that it was a very substantial construction with a domed superstructure and very solid walls of ca. 10



Figure 4.4. Oven F.3955.

thick. They were greenish from the inside, c. 2 cm thick followed by the layer of burnt clay. This is indicative of numerous expositions to heat. The inner surface of the wall is smooth, albeit uneven. The oven interior was made of rubble, including large fragments of destroyed domed superstructure. Soon after the oven went out of use, a smaller oven F.7181 was constructed within its perimeter. It was poorly preserved, mostly by the rubble material which probably might have been a part of the oven construction. Unfortunately, no further details are available as it was not only partly placed outside the trench, but its eastern part got also truncated by a large cut that also destroyed S part of B.121 (Space 516). The oldest and the smallest in the cluster is oven F. 7190.

The stratigraphic position of the ovens, in particular in relation to the walls of B. 110 and 121, indicates that they are clearly post-Neolithic in date. It is not clear at this point whether the oven was constructed at the very late Neolithic or whether it happened immediately following the end of the Neolithic. It is clearly pre-Hellenistic (perhaps Bronze Age), as two ovens (F. 3955 & F.7190) got truncated by a Hellenistic pit (F.3934).

The second major destruction in this part of the TPC Area was caused by a large cut that destroyed the central part of the southern wall of B.110. The pit was large, deep, almost circular in shape, and easily distinguishable (F. 7154), followed by a set of six pits (Space 508). It truncated not only the southern wall of B.110 and northern wall of B. 121, but also the northern part of infill of the latter building (Space 514). It is a deep feature made of brownish sandy clay mixed up deposits, with numerous fragments of yellow sandy bricks, which more likely originate from the destroyed S wall of B.110. After the truncation was backfilled, its surface was intensively used. Six pits were found in



Figure 4.5. Dog burial F.3997.

its infill characterized by a significant degree of homogeneity (F.3997, F.3969, F.3999, F. 7156, F.7155, F.7158). They were of a rounded/ovoid shape, all similar. It is difficult to state the time difference between the abandonment of the pit F. 7154 and the construction of this set of pits on its top. Particularly interesting is F. 3997, where a dog burial was identified (Fig. 4.5). The skeleton was almost completely preserved except for the skull, pelvis and upper hind limbs. It was placed on the right hand

side, its front legs were slightly extended and the hind legs flexed. The latter two elements were probably removed by burrowing animals. The location of the skull is difficult to understand. However, the cut of the pit with a dog skeleton was difficult to distinguish. A piece of copper was found next to the skeleton. Remains of other dog burials were also found in F. 7158.

A stratigraphic position of Space 508 implies that it is to be dated to the period between the end of the Neolithic and the beginning of the Hellenistic period. It truncated walls of the Neolithic buildings and got itself truncated from the East by a later pit F. 3939, which in turn was truncated by a large Hellenistic pit (well?) excavated in the 2012 season (see Marciniak et al. 2012).

The next event comprised a cut of pit F.3939, placed against eastern wall of Trench 2. It was of a very atypical shape as it was a kind of rectangular and pretty regular. It truncated clearly F. 7154 and eastern wall of B. 110. Its depth differs significantly from 2-3 cm on top of the wall to up to 40 cm in places in which the walls were significantly truncated. It was placed behind the eastern wall of B.110, directly to the north of a post-Neolithic truncation that destroyed these walls (Space 507). It was made of relatively mixed up material with numerous fragments of small bricks, charcoal.etc. Hence, there was probably a significant time span between cutting pits F. 7154 and F. 3939, but the latter was clearly constructed before the beginning of the Neolithic.

The final destruction in this part of the TPC Area was caused by a huge truncation (Space 507) that is also to be dated to the pre-Hellenistic period. It is indicated by the fact that a vast majority of Hellenistic pits were dug onto it, while the bottom of some others was placed above this pit. Furthermore, a majority of early Islamic burials were also dug into this layer. The cut was large and had steep walls. However, it is unclear what the initial function of this truncation was and what its original shape was. In any case, numerous late pottery was found in different layers belonging to this Space. It was pretty homogenous, but tended to be made of two sequences. The ones to the south (30255, 30265, 30285, 30711 & 30724), were composed of greyish sandy soil, while those

further to the south were composed of brownish, less silty, deposits (30266, 30286, 30710 & 30723).

The last destruction in the area between Trenches 1 and 2 had a form comprised of longitudinal truncation in E-W alignment that destroyed the top fragments of the southern wall of B.110 (Space 497). It was recognized in the 2012 excavation season. It was backfilled by rather homogenous layers, which indicates its slow accumulation (see Marciniak et al. 2012).

A large section of southern and western parts of the fill of B.121 was later truncated by a cut from its southern and western side (Space 516). It was filled by fairly homogenous deposits with a lot of organic matter (e.g. 30780). They also contained a large number of late pottery fragments. Inside this layer, an oval pit (F. 3783) was found and excavated. It contains a lot of organic material, in particular charcoal and large number of animal bones. This sequence of late truncations destroyed almost completely the southern part of Trench 2, in particular the latest phases of the Neolithic occupation.

Remains of the late walls (probably Roman) were located in the very SW corner of Trench 2. It may belong to some kind of building located south of the trench. Two superimposed layers, defined largely arbitrarily, were also excavated. The southern layer (30266) was made of greyish sandy silt and it was a result of a huge truncation that happened after the Roman period and before the Islamic burials (Space 516). This late truncation destroyed the Roman walls seen in southern section of the trench, but late burials were dug onto this redeposited layer.

### **The Early Islamic burial ground**

The 2013 excavation season also brought about a number of late burials. The best preserved was a burial of a young adult individual (F.3994). It was placed on its back in extended position with head facing SW. Only the legs, pelvis and fragments of the spine were recorded within the trench. The remaining parts of the skeleton were outside of the excavated area, which will not be excavated in the current project. The individual was placed in a very narrow burial cut, which extends a pit towards his head. It looks as if the burial was truncated by a Hellenistic pit and hence it is pre-Hellenistic in date.

Another burial (F. 3974), probably early Islamic in date, was located in the southern part of Trench 2 (see Fig. 6.18). It was a female adult lying with its head to the west, on its right side facing south. The burial was aligned in an east-west axis. No burial goods were found but a separate human mandible was found close to the feet of the buried female. This probably originates from the disturbed earlier burial. Interestingly, a fragment of two superstructures (30203 & 30237), in the form of yellow grey bricks, seems to truncate the burial indicating its later chronological position.

A fragment of largely destroyed juvenile skull (30233) was taken out of the E section of the trench. It was a part of burial late in date. This may be the same type of burial as those excavated in 2012. Its head was facing the west, which means that the remaining part of the skeleton was placed outside the excavated area.



A longitudinal pit in E-W alignment was also revealed in SE corner of Trench 2 (F. 7180), just above (Space 516). Its unspecified and pretty shallow (up to 15 cm) feature contained some human bones in its infill and it was placed underneath a late burial and may have been destroyed by it.

Interestingly, it was defined by two E-W walls. One wall was built parallel to the eastern edge of the trench, just in its SE corner (F.3972). This pit infill appears to be deposited against this wall. Another unspecified wall was also placed further to the north, closing down this space. Southern part of this feature is difficult to define as it is probably placed outside the southern edge of the trench.

### Results of the excavations in Trench 3

#### The Neolithic sequence



Figure 4.6. Walls F.7171 and F.7176.

In the 2013 season, excavation works were also continued in Trench 3. Altogether, a number of Neolithic features was recognized, several of which have been truncated or disturbed by later inhabitants of the area. They also brought about excavation of later remains, in particular a large Hellenistic Building 120.

Evidence for Neolithic occupation in Trench 3 takes the form of several segregate spaces in the trench; all of these spaces are related in some way to three large walls running east-west across the northern half of the trench, built immediately against one another. From south to north, these walls are F. 3952, F. 7171, and F. 7176 (Fig. 4.6). They are composed of large rectangular mud-bricks which are orange in color. The major construction appears to be the northern wall, F. 7176, which is the southern wall of B. 122 (see below). It was a solid a large building with numerous re-buildings and reconstructions of its inner space. An understanding of the architecture of the larger complex of B. 122, the functions of the spaces inside it, and the temporal sequence of its construction is currently

impossible as a large part of the building is placed outside the excavated area. The building's southern wall later served as a point of reference for other structures constructed further to the south. The subsequent walls (F. 7171 & F. 3952) were not bonded with the former and more likely



postdated them. This may be a part of another large building placed further to the south (Space 520 – see below). These kinds of large walls, or rather, sequence of walls, is characteristic of the Late Neolithic architecture. They surround several large, walled, interior spaces that together form buildings that appear to be much bigger than the earlier Neolithic ones. These buildings are arranged more like complexes of spaces with differing functions.

Due to post-Neolithic destructions and the limited area under observation, an understanding of spatial arrangements is currently limited. However, it is more likely that we are dealing with two solid Neolithic buildings, placed one next to the other (B. 122 in the north and Space 520 to the south). As the latter one is clearly placed slightly below the former one, this may indicate some kind of terrace. Another E-W terrace was probably located along the slope further to the south. Its northern face was later used to construct the northern wall of the Hellenistic building, B. 120 (see below), built directly against it. These may be indicative of a terracing pattern in this part of the mound and placement of a row of houses on subsequent terraces, all facing south. The terracing of the mound surface in the Late Neolithic would not be surprising considering the discussed buildings were constructed on a significant slope. The Neolithic builders must have been forced to follow the covertures of the mound.



Figure 4.7. of space 493 and its bins.

The major Neolithic structure discovered to date in Trench 3 comprises B. 122 in its north part. It is a large complex-style structure, which extends beyond the edges of the trench. It is composed of three spaces located within Trench 3 (Sp. 517, 521, and Sp. 493). The most interesting is Space 493, a kind of storage room with three well preserved bins and one oven (Fig. 4.7). The relationship between these three spaces is not entirely clear. Further excavation to the north of the Overview trench would resolve numerous questions related to the Building spatial

arrangements.

This room Sp.493 marks the later phase of the Building use as it was built inside its NE corner some time after the house was constructed. Its southern and western walls (F. 3981 and F.3933), as located within the trench, were identified. The northern and eastern extent of the space is undefined because it goes into the edge of Trench 3. The room construction was preceded by a destruction of some kind of a structure ('platform?') placed against the eastern wall of that building. As the eastern part of the room is outside the excavated area, it is unclear whether the platform

was built against the eastern wall of B.122, or the eastern wall of the Space was constructed following the destruction of the former structure.

Both the inner and outer room's walls were then plastered over, which means they were clearly meant to be seen from outside within the space of building. This implies a kind of standalone and distinct room, as further corroborated by bonded courses of bricks. However, it cannot be ruled out that the outer surface of the wall was only plastered later when the wall was reused and comprised the eastern of later room built inside B. 122 (Space 517) (see below). Two of the features recognized in the Space (F. 7182 and F. 7198) were excavated completely in 2013, but the other two (F. 7196 and F. 7197) were left unexcavated. Storage bins and different tools revealed in Space 493 indicate that this is a room for grain storage and food preparation. The building was burnt before its abandonment. It is dated to the period ca. 6400-6250 cal. BC.

Space 493 within the trench has 3 m<sup>2</sup>. The room infill contained a heavily burnt layer mainly made up of construction material. It also yielded a lot of botanic remains and several ground stones. It is worth noting that a large quantity of essentially pure phytoliths was found in its north and middle part. They indicate a higher firing temperature in this part of the room as compared to the southern part where more charcoal and black, charred seeds were found, indicating a lower temperature and reducing atmosphere. Both the phytoliths and charred remains represent a now-extinct species of 'striate emmeroid' wheat (Fuller 2013). 32 ground stones, as they were situated in the burnt construction layer and not on a floor, are thought to have been placed or thrown inside the space during the destruction phase. A deposit of charred barley and wheat seeds (30807) was found in the southern part, which could represent a hanging basket which fell during the destruction or a small organic container, thrown in during the destruction. They both were clearly stored in the ears (Fuller 2013). In the west-middle part of the room floor, a cluster worked antler, bone, clay object, and ground stones were found. If it is *in situ* it could be interpreted as tools or raw material of tools in connection with the function of the space.

Two of the room bins were excavated this year. Both turned out to be storage bins for barley grain. The amount and preservation of the barley could indicate a quick destruction phase. Storage bin F.7182 F. was a large bin, rectangular in shape, built up against the western wall of the space, F. 7183. On top of the bin fill associated with the destruction of the space (30784), with numerous charcoal and barley, was a cluster of barley (30785), likely representing another hanging parcel. Below (30784) were two layers of nearly pure barley - (30859) and (30864). The latter unit separated the barley concentration and the white plastered bottom of the bin. Storage bin F.7198 was a smaller, free standing bin, in the south-west corner of Space 493. It was only 0.30 m long and 0.29 m wide. Like F. 7182, it contained a great deal of fill associated with the collapse of the space (30833) and beneath this, a deposit of pure barley (30871). This unit was black and full of grain, unlike u.30833 above, which suggests that the bin was used as a grain store. Some of the fill had fallen out through an animal burrow in the bottom part of the bin.

Sp. 517 is the latest room built inside B.122, later than the adjacent Space 493. It is indicated by radiocarbon date from its floor (6230-6070 cal BC). Interestingly, it significantly postdates the latter storage room, which may question whether these two rooms are actually elements of the same building. It occupies its NW part, extending past the north trench boundary. It is bounded to the

south, west, and east by three walls - F. 7194 forms the southern boundary of the space and is built up against F. 7176. There is visible plaster on the north face of F. 7176, which must have been present when F. 7194 was built; therefore we know that F. 7194 was built after the construction of F. 7176. To the west, Sp. 517 is bounded by F. 7260 which runs north-south along the western edge of the trench, and it is bounded to the east by F. 7183. Its eastern wall comprised the western wall of earlier Space 493 (F. 7183) and is plastered on its western face (see above). No plaster has been identified on the interior faces of the other walls so far. The function of Sp. 517 is still unclear, as no architectural features or significant artifacts have been recovered from the space. Two successive floors, however, were revealed in the 2013 season. Both the later one, F. 7195, and the earlier, F. 7257, exhibited signs of having been plastered originally and, in fact, remnants from both of these plastering events lipped up to the well-preserved plaster of the eastern wall F. 7183. Floor F. 7257 was left unexcavated at the end of the 2013 season.

Sp. 521 similarly serves no clear function. It lies to the east of Sp. 517, with wall F. 7176 serving as its southern wall, F. 7194 as its western wall, and F. 3981 as its northern wall. The space is extremely narrow, measuring only 0.65 m north-south, and 2 m east-west. It has been truncated to the east by a large pit, F. 7188, which contained a great deal of post-Neolithic material in its fill. Given the narrowness of the space, it may have served simply as a passageway when it was constructed, although the damage done by pit F. 7188 makes it difficult to understand this space in its full complexity. One floor was found in this space in the 2013 season, F. 7199, which was plastered like the floors in Sp. 517, with the plaster of the floor joining with the plaster on northern wall F.3981. In excavating the plaster (30838) and makeup (30839) of this floor F. 7199, a great deal of barley was discovered, indicating the close association of Sp. 521 with Sp. 493 to the north, since Sp. 493 represents a space used intensively for grain and cereal storage.

Only centimetres below the surface and above Space 517, a series of Neolithic human burials were identified. These originate from some kind of building or burial chamber later than B.122 but completely destroyed due to a range post-depositional processes. This does not appear to be a location of the burial but it cannot be ruled out. 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 (see Marciniak et al. 2012).

To the south of B. 122, there are two spaces which share a wall (F. 3952) with the building. They certainly comprise a part of larger buildings. As excavations of the part of the trench have not been completed, it is unclear whether these spaces represent two separate buildings or two spaces belonging to the same building. The eastern space, Sp. 520, is squarer than the spaces to the north, measuring 1.88 m x 2.74 m (Fig. 4.8). It is bounded by F. 3952 to the north, F. 7172 to the west, F. 7252 to the east, and F. 7253 to the south. Although the base of the northern wall was revealed, there was no surface or floor associated with the wall. This is consistent with findings in the TP excavations (e.g. Building 74) as well as Trench 1 in the TPC Area (B. 110), where excavating room fill



Figure 4.8. Overview of space 520.

has frequently failed to reveal surfaces or floors at the bases of walls. There is evidence to suggest a similar event occurred in the adjacent space, Sp. 515, which shares wall F. 7172 with Sp. 520 (see Fig. 4.6).

Space 515 was recognized against the western wall of the trench and it extends past the western edge of the trench. It is more likely a part of the Neolithic building that extends

further to the west and may go as far as the foundation trench of the large shelter. It is additionally bounded by F. 7177 to the east and F. 7174 to the south, although not all of these walls are contemporaneous; F. 7177 runs below F. 7172 and at a slightly different angle, representing an earlier construction. Evidence for the removal of a preexisting surface in Sp. 515 comes from the remains of platform F. 7173, which is plastered on top, but has been cut away on three sides, exposing the layers underneath this plaster. A distinct depression in the platform central part probably indicates a burial. A small portion of the floor associated with this platform remains, but it too has been cut vertically, leaving the platform and floor plaster essentially floating on a sort of stratigraphic pedestal. Why the surface removal would have been partial in Sp. 515 yet complete in Sp. 520 is not clear, but the evidence suggests that the same sort of event occurred in both spaces, explaining the lack of identifiable surfaces in either of these spaces.

The temporal relationship between Sp. 515, 520, and B. 122 is still unclear, as these spaces are segregated by walls F. 7171 and F. 7176, both of which predate all of these spaces. The building with Space 515 is most probably earlier than B. 122 in the northern part of Trench 3.

### **The Hellenistic settlement**

The next major occupational activity in this part of the TPC Area took place in the Hellenistic period. The settlement is represented by large building (B. 120) and ca. 20 large pits. The 2013 season brought about excavation of these pits. They were circular in form, but varied in size and depth. Few artifacts were found in them, and there was no evidence of scorching or other use at their base, leaving the function of these pits enigmatic. These pits are therefore consistent with possibly Hellenistic pits excavated in the other TPC trenches (see Marciniak et al 2012), as well as pits found in the TP area (Czerniak and Marciniak 2003, 2005; Czerniak et al 2002) and the upper layers of the South area (Kotsakis 1997) - although the sizes of the pits in Trench 3 are more varying in general than the pits identified in these other areas.



A large Hellenistic building (B. 120) is located in the southern part of Trench 3. It is dated back to 325-167 cal BC. Its chronological position is further corroborated by four complete vessels found on its floor. The building was extremely burnt, but at one time, the floor, walls, and the three bins found in it were all plastered. It is placed in terracing cut (30229), which extends beyond the southern extent of the trench. It more likely followed the earlier Neolithic terrace, but it was later deepened and expanded to prepare for the construction of B. 120. The mudbricks of the exterior walls of B.120, F. 3984 (western) and F. 3948 (northern), were packed into this cut. It was itself extremely jagged, and where bricks did not fit well into the stepped and sloping cut, clay was often packed in. The western wall of the building was placed directly on top of the Neolithic wall.

The size of the building cannot be estimated as its parts go beyond the edge of the trench. The northern wall extends past the eastern edge of the trench while the western wall its southern edge. Hence, the eastern and southern walls of the building are beyond the excavated area. The floor of the building was made of a grayish silty surface. It was pretty distinct, but not particularly flat; however, evidence of plaster on the walls and on the floor was discerned. Three distinctive and overlapping features were found inside it. These features were rectangular in shape and consisted of a molded edge surrounding a shallow depression. All three were extremely similar in appearance, averaging 1.82 m long, 0.95 m wide, and 0.31 m deep. The latest one was F. 3993, which was built on top of both F. 7151 and F. 7152. They were made of brick, and both F. 3993 and F. 7151 exhibited signs of plaster (with F. 3993 being completely plastered). These features have been termed “bins”, despite their shallowness. Evidence for this designation comes in part from (30247), the preserved contents of F. 3993 (30247) consisted purely of burnt remains. We are still awaiting analysis of this unit to determine if F. 3993 did in fact likely function as a storage bin, or if it suggests another function. Bin F. 3993 was the only one of the three still containing remnants of contents; in fact, the bin that was likely the earliest - F. 7151 - appears to have been systematically emptied and dug out. It was significantly deeper than the other two bins, and rather than having a shallow, gently sloping depression, the sides of F. 7151 proceeded sharply and vertically to meet the base at a right angle. This was probably the effect of a cutting or digging event which occurred when this bin fell out of use.

Another enigmatic aspect of B.120 is an apparently interior wall, F.7150, which extends toward the east from the western exterior wall F. 3984. This probably served as a partition wall. It was built on top of the floor of the building, F. 7153, and was composed of both heavily burnt mudbrick material and stacked roof finials. This wall seems to have been a hasty and haphazard later addition to a building which was already inexactly constructed.

The building infill, ca. 50 cm deep, was a highly heterogeneous rubble made of fragments of constructional materials broken bricks and clay. They seem to be indicative of some kind of destruction and elements of this structure construction were dumped inside. This is further indicated by a thick layer of ash and burnt staff that is indicative of some kind of fire that possibly destroyed the building. The destruction and abandonment of the building were likely to have been sudden and concurrent events, effected by the fire concentrated in the northwest corner of the building which scorched and damaged walls F. 3984 and F. 3948. The eastern half of the building showed no evidence of singeing or other heat damage. The suddenness of the destruction of B. 120 is furthermore supported by the several intact vessels found on its floor as mentioned above. After

the destruction of B. 120, the northern wall F. 3948 was disturbed by a roughly rectangular cut (30227) following the line of the wall. This cut has been interpreted as a robber's trench, F. 3987, although the aim of the cut is not entirely clear. It could have been related to the retrieval of objects from the building - as its executors may have known that the building had not been emptied before its abandonment or could have been an attempt to recover mudbrick material for agricultural purposes.

### **The Early Islamic burial ground**

The final destruction was caused by large inhumation Byzantine and early Islamic cemetery, already revealed and excavated in the northern part of the TPC Area as well as in the previously excavated TP Area (Czerniak et al. 2001, Czerniak et al. 2002, Czerniak et al. 2003). However, their number is much lower than in these both areas. The late burial (F.7179) was revealed in the NE corner of Trench 3, just south of B. 122. It contained the skeleton of an adult male with the well-preserved condition of the bones and the extended burial position. The individual was buried in an E-W orientation with all elements below the humeri buried past the eastern limit of the trench. Only the proportion of the individual which lay within the bounds of the trench were excavated this season; the rest of the skeleton was left unexcavated. A distinct grave-marker for the burial was recognized (F. 3963). It was a short mudbrick wall of two courses extending only a half-meter from the eastern edge of the trench. The mudbricks were extremely regular, 40 cm long and 40 cm wide, and were the distinctive light grey color.

Another late wall with three courses of regular light grey mudbricks, measuring 40 cm x 40 cm, was found further to the south (see figure 2). This wall was built into a terracing cut (30228), which dug visibly into the *in situ* orange mudbricks of preexisting Neolithic wall F. 3952, as well as into the fill of Hellenistic pit F.7188. The function of this wall was not clear, as it did not seem to be associated with any other architectural features found within the trench.

### **Final remarks**

Results of the two first excavation seasons in the TPC Area revealed a range of interesting features characteristic for the Late Neolithic. 11 radiocarbon dates available to date are very homogenous and date the studied structures to the period between 6350 and 6100 cal BC. However, it is worth noting that these dates originate from earlier levels, out of those excavated so far, while the later Neolithic structures are so badly destroyed that did not bear any reliable datable material. Both the range of these dates and the character of the settlement architecture imply that the studied sequence may have been in use as late as in the TP Area, which is the very end of the 7<sup>th</sup> millennium cal. BC. This is irrespective of the fact that these structures are located ca. 3 m below from the latter sequence. This should imply some kind of terracing respecting the shape of the mound. This kind of spatial organization is seen more clearly in Trench 3 where a sequence of buildings was more likely constructed in rows. The results of our works revealed also a range of characteristic features of the Anatolian Late Neolithic. This is manifested in the sheer size of the buildings, presence of pebbled floors, construction of smaller rooms inside existing larger structures as well as a probable lack of intramural burials and monumental installations. They largely remind arrangements from the top of the mound; however, there are also some differences. These will be systematically examined during the next three years of field works in the TPC Area. This represents a unique opportunity to

understand a period of Çatalhöyük's occupation that has not been documented or studied very intensively in the past.

It is worth stressing that Neolithic structures in all three trenches were badly destroyed by numerous intense activities from a range of different chronological periods. Those were found particularly in Trenches 1 & 2. The first large destruction in the part of the TPC Area was caused by two large truncations (Space 508 and Space 497), which significantly destroyed the southern wall of B.110. They were later backfilled with a range of heterogeneous materials. Interestingly, both of them were pre-Hellenistic in date. These were followed by a storage zone of Hellenistic settlement represented by numerous large pits and were excavated in the 2012 excavation season (Marciniak et al. 2012). Similarly substantial was Hellenistic settlement in the southern part of the TPC Area. It is manifested by a large Hellenistic building (B. 120) with well preserved in-built structures. These deposits in the first two trenches were further destroyed by two large truncations (Space 507 & 516). The final destruction was caused by large inhumation Byzantine and early Islamic cemetery, already revealed and excavated in the TP area (Czerniak et al. 2001, Czerniak et al. 2002, Czerniak & Marciniak 2003).

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## Building 98



Figure 5.2. Overview photo of B.98 with B.125 at the end of the 2013 season, from east.  
Photography: Jason Quinlan

This year's excavations were focused on **(1) investigating the floor stratigraphy** in the building, including **(2) installations connected to the floors**; and on **(3) contexts under the floor**, i.e. events predating the construction of the house. To this end, a large sondage was excavated in Space 449-Space 450; and smaller sondages were dug in Space 341 and Space 452, where floor was removed in arbitrary rectangles and all sediment was collected for flotation.

**(1) floor layers:** There were in total three successive white marl floors in the building. The earliest, (31143), was only found in Space 449 and the eastern part of Space 450. It seems the rest of the building did not have a plastered floor at this time or was not well enough preserved to be recognised ( (31143) was not well preserved, large patches were missing).

The second floor (18376) covers the entire building and is well preserved, as is the uppermost floor (16977). Only a very thin layer of grey sediment (31144) separated the oldest and middle floors (31143) and (18376), while the space between (18376) and the uppermost floor (16977) varies. They are also directly on top of each other in the centre of the building, again with only a few millimetres of grey sediment between them; this layer (18367) gets thicker towards the walls, as observed in Space 449 already last year: (18376) slopes down towards the southern wall F.3333 and the buttress F.3372, while the upper floor (16977) is horizontal. Within the thicker part of the homogeneous grey sediment (18367) along F.3333, a deposit (18369) of over 100 clay balls was found in 2012, partially under and partially in front of the wall. Floor (16977) is generally well preserved and thick (up to 5cm, varying thickness due to undulating surface of sediments underneath) with the exception of Space 340 in which only patches of the floor are preserved.

**(2) Building 98 had had several installations.** In southern Space 452, in the corner of wall F.3324 and buttress F.3326, an installation F.3391 was found and preliminarily called a 'basin', and is made up from a little wall (31242) of marl on top of marl floor (31240). (31240) is most probably identical to the middle floor layer (18376), however as the area between them was not excavated, that has to remain a hypothesis. Again, a very thin grey layer was found between (31240) and the installation wall (31242) indicating either a foundation layer or a period of sedimentation between the construction of the floor and the construction of the installation. (31240) runs northwards from F.3326 in a curve towards east; its northernmost part seems to have been so badly preserved that



Figure 5.3. Installation F.3391. Photography: Patrick Willett

we did not recognise it when investigating the floor sequence in northern Space 452 earlier in the season.

On the floor of installation F.3391, a layer of orange powdery clay (31237) was found reaching up to nearly the height of the installation wall (up to 5cm). The orange colour seems to indicate that the clay was affected by fire, however, none of the surrounding plaster layers seem to have been burnt. Also, no visible finds or inclusions enlighten the meaning of this orange layer – results from flotation might bring new insights.

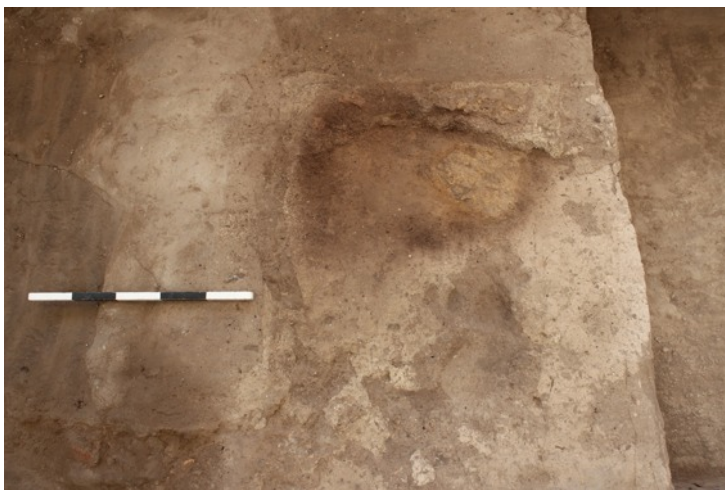


Figure 5.4. Burnt marl layers in the corner of F.3335 and F.5052. Photography: Patrick Willett

Both the wall of installation F.3391 and the orange fill are covered by the uppermost floor (16977), with (16977) having been directly applied onto the lower feature. This installation therefore goes with the use phase of floor (31240)/ (18376) and predates the youngest floor (16977) and related activities.

On top of (16977), two installations were found. One, not very well preserved, was found in the corner of the wall-buttress construction F.5052-3335. Here, only the fragment of a marl layer (31250), applied against the marl plaster on the buttress-like feature, was found. (31250) seems to have formed a small wall and floor, both painted red on the surface. As there is only 6x12cm preserved an interpretation of this feature is difficult. The red paint is blackened, indicating fire impact, and also the floor (16977) is burnt orange in the very corner of F.5052-3335. Several small patches of clay ( (31247), (31248), (31249) ), also burnt to varying degrees of orange, red and black, were found on (16977) and (31250), but their function is unclear. This entire corner with the installation and fire impact is only ca. 40x60cm large.



Figure 5.5. Installation F.3385 and plaster ridge against F.3370, lower left corner of the photo. Photography: Patrick Willett

No fire seems to have affected a 'basin' in the very southwest corner of the building, in Space 341. F.3385 is made up from several thick lumps of marl clay, a material that we often somewhat incorrectly call 'plaster' because it seems to be the same material as the plaster on the walls. Each of these lumps looks rather amorphous, but together they clearly form an intentional construction surrounding a rectangular space in the corner of walls F.3369 and F.3370. The marl lumps also stretch along F.3370, abutting the wall plaster of this feature (also made from marl), one of them forming a thin ridge that is not visibly disturbed, but its function might only become clear after we have the results of the flotation.

F.3377 in Space 452, partially excavated last year, was further investigated and removed this year, but remains unclear due to its bad preservation. The marl lumps and the one large white stone making up this feature might be an intentional bin-like construction, but might also be of secondary nature as no connection of the floor and bins was found - it seems floor (16977) was not preserved or present here. The 'bins' are built up against a vertical plaster layer, which was applied onto fill-like sediments close to wall F.3379, separating Sp.452 from Sp.446; the feature is close to the wall, but not directly related to the wall. Botanical analysis of the fills might clarify the 'bin'-hypothesis.

**(3) The sondage** under Space 449 gave insight to **pre-B.98 events**. Under the floors, a grey layer (18377) was excavated which was remarkably homogenous concerning sediments, but contained many artefacts, including a figurine and a small cluster of pot sherds (31191). It was noticed in the sondage sections that the bases of the construction features are lower than the floor layers which run up to the plaster on the buttresses – and that the top of (18377) seems to slope down towards the features, indicating that sediment was removed, possibly during the construction process.

Under (18377), two more homogeneous layers were excavated, (31196) with a reddish-yellowish colour and (31214) of dark grey colour, both marked by an unusual low density of artefacts in them. This led to the hypothesis of them being results from intentional pre-construction preparation of the area. (31214) directly overlay deposits (31222) and (31227), (31233) and (31246) which are interpreted to belong to B.125.

### **Building 125**

Building 125 is under Building 98; we only excavated a small part of it in the sondage (2m x 2m) under Space 449, identifying one buttress F.3387 protruding from wall F.3395. Both features seem not to be brick constructions, but made with a wet earth technique. A white plaster layer is clearly visible on their western facades. The eastern limit of the wall was not within the sondage, and the southern part was not clearly recognisable.





Figure 5.6. Overview photo of B.125: buttress F.3387, wall F.3395 and surrounding fill deposits. Photography: Patrick Willett



Figure 5.7. Dome-shaped red clay layer (31222) overlaying remains of B.125, visible as buttress lined by white plaster. Photography: Patrick Willett

This might be due to the fact that B.125 seems to have had an eventful end of life. Probably, the construction features were only preserved a few centimeters high, as we seemed to see a plaster floor (31218) under the building fill layers, connected to the wall plaster, and the walls being only slightly higher than the floor level. This is not entirely verified, though, as we did not remove all of the fill layers and thus could not clearly see the floor. The infilling deposits ( (31227), (31233), (31246) ) are very interesting as many of the materials in them were affected by fire. All units contained larger amounts of clay that had been fired orange, and black materials that presumably are burnt organic matter. Two very black lenses ( (31217), (31245) ) were found and completely sent to flotation, which might provide insight about the origins of these deposits. The amount of burnt materials decreased towards south.

Further analysis is necessary to interpret the sequence of events indicated by these observations. The very low preserved height of the walls in B.125, unusual compared to the other buildings in the trench, could indicate an intentional razing of the walls. Whether the fire that produced the colourfulness in deposits around the walls happened *in situ*, or whether these are secondary deposits is also not clear: the walls and their plaster do not seem affected by fire, but the potential floor (31218) is orange which could or could not indicate burning. Both the walls and the deposits were covered by a thick layer with unusual features: a rather homogeneous dark red clay sediment

(31222), shaped like a dome, filling nearly the entire area of the sondage and going beyond it in the east. It was discussed during the season whether this was an intentional deposition which, due to its dome-shape, would be related to covering of underlying features (B.125) rather than the construction of and/or preparation of a foundation layer for B.98.

### **Space 446**

Further excavation in Space 446 and northern Space 452 (see F.3377 discussion above) provided further insight into the history of this room.

Last year, we removed two small wall features (F.3320, F.3321) which bordered Sp.446 from the south and west, leaving an opening towards Space 452. This year we found that both features had been sitting on older walls, made from a distinct yellowish-grey brick material and dark grey mortar: F.3379 runs east-west, closing off Space 452 from Sp.446, abutting both F.2428 and F.3324. It forms a corner with F.3367, made from the same material, which runs northwards and outside the trench. F.3379 is interesting in the respect that it must pre-date at least the wall-and-buttress F.3335-F.5052 belonging to B.98, and possibly also the other features around it (F.2428, F.2429, F.3324). Of the many floor layers excavated in Space 446 in the years 2010-2011, two ( (15170), (15190) ) ran up to the base of F.3320 while a stack of seven floor layers ( (15341), (16927), (15371), (15388), (15395), (15398), (15399) ) was on one level with the top of F.3379 and partially directly abutted the wall. Of these layers, the uppermost (15341), made of thick orange clay, extended into eastern Sp. 446 north of F.3330, but seemed to not be directly connected to this wall. The last layers of this thick stack of floors were removed this year, and homogeneous sediment (31131) with only low amounts of artefacts was found underneath.

The east-west wall F.3379 could be part of one wall with F.3330 of B.127 (see discussion below) – both are made of the same distinct materials (yellowish ‘brick’, dark grey ‘mortar’, applied in horizontal layers with no vertical mortar layers) and have the same orientation.

We can conclude that Space 446 was probably built earlier than B.98 and B.127. The layout of the area where F.3367 and F.3379 meet might indicate that there was more of this building here at some point, but this was destroyed before the new walls F.2428 and F.2429 were built. This might be supported by the fact that the top of F.3379 was clearly cut: The wall is higher in the very west and very east, and lower where it runs between Space 446 and Space 452.

### **Building 127 – with some updates on Space 447**

Building 127, east of B.98, was excavated during one season in 2010 as Space 448. Excavations did not go very deep below the topsoil level with post-Chalcolithic disturbances, so that the walls surrounding the space were not clearly defined, and the buttresses were not found. Consequently, it was hypothesised that this might be an open, un-roofed space. The northern wall F.3330 seemed to not meet wall F.3324, but to leave an entrance connecting Space 446 and Space 448/B.127.

After removing another 75cm of partially undisturbed, partially still disturbed deposits ( (31169, (31215) ), three internal buttresses were clearly visible, as was the eastern part of wall F.3330,

forming a corner with F.3324 and therefore disproving both the entrance-hypothesis and the open space hypothesis.



Figure 5.8. Cluster (31206) In B.127. Photography: Patrick Willett

The deposits in B.127 between the wall features contained the usual range of artefacts and other inclusions (charcoal, burnt and unburnt clay, very small stones, phytoliths, burnt daub) but not in very high quantities. Outstanding was a large cluster of finds (31206) that contained some finds that we never encountered before, such as the rib of a large animal, presumably cattle (31206.x3), two pieces of a shiny mineral (31206.x4, .x5) found close to each other and a worked bone with two holes in it (31206.x9).

The construction features of B.127 are interesting because the materials used to build them indicate that this is a patchwork house. Very unusual is that the western wall of B.127 (F.3324) is also the eastern wall of B.98 – in no other case observed on the West Mound do buildings share walls. Two look-throughs in wall F.3324 ( (15336), (15337) ) also indirectly connect B.98 and B.127. F.3324 was built with the same rammed earth or cob technique as the other features in B.98, and thus probably at the same time. This presumably makes the western buttress F.3384, abutting F.3324, younger than B.98. F.3384, and also the other two excavated buttresses F.3383 and F.3388, is made with a technique that uses alternating thin and thick layers of clay mixture – which looks like bricks at first glance, but is not. As the buttresses are all made with this layering techniques, and the same grey materials (thin light grey ‘mortar’ layers, thick medium grey ‘brick’ layers), they are interpreted to have been built at the same time.

The northern wall F.3330, however, was also made with the layer-technique, but from different materials, namely the yellowish ‘brick’ and dark grey ‘mortar’ also used for F.3379 with which it could be one identical wall – the south wall of Sp.446.

The southern wall F.3399 of B.127 is bonded to the adjacent buttress F.3383 and presumably abuts F.3324, but the tent foot was standing on this connection so it could not be excavated. The wall runs parallel to wall F.3322, which was recognised in 2010 and interpreted to be the south wall of Sp.448/B.127. This had to be reconsidered in the light of new discoveries. Checking the photos from 2010, it seems that F.3322 could be part of one wall with F.3332, a wall made from two parallel rows of brick running directly next to each other without any gap and representing the northern wall of adjacent Space 447. This is supported by the observation that F.3322 and F.3332 have very similar sizes and materials. Thick walls made from two parallel rows of brick which are not connected through the header-and-binder technique were also found in B.106, where this construction method was investigated in details in 2012. Alternatively, F.3322 and F.3332 could indeed be separate constructions, built at different times. In this case, we would have three parallel walls F.3399, F.3322 and F.3332 which would be indicative of changes to the spatial organisation of this part of the neighbourhood.

## Building 107



Figure 5.9. Overview of B.107 at the end of the 2013 season, from the southeast corner.

Photography: Jason Quinlan

At the beginning of the season, we carried out limited **(1) room fill excavation** to remove some irregularities in the bottom surface that could have become health and safety issues. But the main focus of our excavation in 2013 was **(2) the clarification of building stratigraphy**.

**(1) Deposits** ( (18397), (18398) ) left against the western wall were removed, unexpectedly revealing a cluster (31101) of many unfired broken pots (see Franz, this report), large animal bones, large ground stones, and the usual: pot sherds, obsidian, stone and bone fragments.

**(2)** Through removing this fill, we found the missing wall F.3378 under F.3344. F.3378 belongs to a phase with F.3304, F.3305, F.3306 and the buttress F.3307, F.3308, F.3308 and F.3355. Wall F.3344 was built on top of F.3378 and is part of the younger building phase.

Details of this younger building phase were investigated by removing part of the walls, targeting the corners and the connection to the one well preserved buttress F.3356. It turned out that none of the walls are bonded in the corners. In the case of the northwest, northeast and southwest corners a possible bonding technique might have been blurred by bad preservation, but in the southeast corner (F.2425 and F.2426) it was clearly non-existing. This confirms the hypothesis that this wall phase was not actually made of bricks, but with a technique that we started calling 'pseudo-bricks': a wall was created by using two materials (marl 'mortar', grey clayey mixture 'brick') that are put onto the wall while wet, in horizontal and vertical layers. The look of such a wall mimics true dried brick construction.



This is indicated especially by wall F.3344, whose 'brick' courses are sloping so heavily that a dried bricks construction can be excluded here. The possibility that the sloping might have happened post-construction seems not to be an option as the wall is otherwise straight and stable without cracks.

It is unclear whether F.3344 was bonded to buttress F.3356, as not much of their connection was preserved – a late burial F.3342 inconveniently cut here. The northern half of F.3356 was removed to uncover the top of F.3355 underneath. As inferred from observing the facade, the top of the older buttress is very irregular, indicating a period of erosion before the younger one was built.

Through removing parts of the northeast corner, wall F.2429, belonging to a building north of B.107, also became much better defined. It is a thick wall made from two parallel rows of brick. Interesting is further the space in between the walls F.2429 and F.5074: this interspace was of very varying shape as the facades of both walls undulate heavily. Plaster was observed on the northern façade of F.5074 towards the interwall-gap. Plaster towards the outside was never observed in Trench 5, so the preliminary interpretation is that F.5074 formed the southern wall of a space located north of it, before this area was restructured and F.2429 was built. How this use phase of F.5074 relates chronologically to it being part of B.107 is still unclear, but since it was not bonded to either F.2425 or F.3344 it could have been built at a different time.

During the last days, we targeted section of all four walls in which we cut back the facades to clearer see the building materials and techniques. The upper parts of walls were made from bricks or 'pseudo-bricks', while the lower parts, much better visible after the eroded facades were straightened, were made from thinner ('mortar') layers of light grey materials and thicker layers ('brick') of medium grey clayish material, i.e. no true brick building, but a technique that looks similar to bricks. The different wall materials could have chronological significance.

### **Building 126 – with remarks on buildings at the southern edge of the trench**



Figure 5.10. B.126 at the end of the 2013 season, seen from south. The fill of Space 345 in the background had been excavated in previous years. Space 525 in the foreground is marked by the white plaster lines on the walls, clearly visible towards the mixed room fill. Photography: Patrick Willett

The features and infill of Sp. 345, the eastern neighbour of B.106, were investigated 2008-2012. Towards the end of the 2013 season, we cleared topsoil south of Space 345 to find the mirroring southern room of this building. The walls of this new Sp.525 were clearly visible, because the plaster on its walls is nicely preserved and appeared as white lines in plan. This allowed us to define one more building, B.126, which is made up of Space 345 and Space 525. After its outlines were defined, this building was not further investigated. Through

the topsoil clearing, the walls of adjacent buildings south of B.126 and B.106 became clearer as well (F.3394 with F.3396 south of B.126, F.3354 with F.3397 south of B.106). They had partially been visible previously, but now the general picture is more consistent. Both B.106 and B.126 are abutted by other buildings, which are mostly outside the trench, and equal to B.126 and B.106 respectively in their east-west width. This also seems to be the case for a building related to wall F.3345 south of B.105, but this area is too disturbed to be sure.

## Building 106



Figure 5.11. Overview of B.106 at the end of the 2013 season, seen from south. Photos: Jason Quinlan

Excavations in B.106 focused on **(1) limited room fill excavation** in both Sp.310 and Sp.454 to expose construction features, **(2) details of the plaster layer 16999** between the wall phases of B.106, and **(3) the investigation of floor layers** in Space 454 were clarified.

**(1)** An arbitrary layer of **filling deposits (31127)** was removed in Sp.310, before excavation concentrated on the

northern half. This small sondage ( (31189), (31207), (31232) ) had the aim to further expose buttress F.3376. As usual, deposits in this space contained many artefacts and interesting materials that were sampled. Among them were many sizeable lumps of white marl, which could either be interpreted as heavily disturbed installations as in B.98 or secondary debris. The exposed facades of the surrounding features (F.3312, F.3314, F.3376) had very well preserved white marl plaster on them.

Well preserved plaster also helped defining the walls of Sp.454 better. The south wall F.3362 had a curious shape, leaning towards the room. Though there were no cracks or other damages visible in the wall, it could be interpreted as either the result of intentional construction or of instable foundations. Unfortunately the upper part of that wall, protruding into the room further than the bottom, had partially been cut by a large pit F.3331, so not all of its shape is preserved.

Buttress F.3376 turned out to be much larger than defined last year. It is associated with walls F.3312, F.3313, F.3314 and F.3362, with which it formed an older version of B.106, a longish building with only one buttress that separated the two spaces nearly completely. A small construction

(F.3386) was built into the gap between F.3376 and F.3314. It abutted the plaster of both features, and therefore must be later. F.3386 was covered in plaster (31254).

**(2) The white marl layer 16999** on the tops of older walls in B.106, under the bases of the younger ones, was partially exposed last year by removing upper features F.2427, F.2408, F.3301 and F.5058. This year, we cleaned some areas further to clarify details. It is now clear that this layer really can only be found between the walls of B.106, it is not in any way related to the walls of surrounding Buildings B.98, B.126 or B.105. Between the western walls F.5058 and F.3312, (16999) is patchy, and some patches are made from greyish clayey material rather than pristine white marl.



Figure 5.12. Plaster layers in Space 454 seen from east; detail of the orange-black layer (31181) seen from west. Photos: Patrick Willett

**(3) Several plaster layers in central Sp.454** had been exposed but not been understood 2010-2012 and were therefore further investigated this year by removing them. A stack of six ( (31172), (31142), (31175), (31181), (31182), (31192) ) marl plaster layers on top of each other, separated by very thin layers of sediment ( (31173), (31180), (31174), (31188) ) was located in the centre of the room. The plaster layers have an oval form and generally slope down slightly towards their centre. One of these layers (31181) was crumbly, and of orange colour with some black patches, indicating that it was affected by fire *in situ*. Another layer (31142) ran all the way up to wall F.3358 and was also connected to the corner with buttress F.3376. In the corner of the features, (31142) slopes up considerably and could be a remainder of an only partly preserved floor – a hypothesis which only the post-excavation analysis can hopefully resolve. In the corner between the walls, (31142) was plastered over with another four layers of marl ( (31152), (31154), (31155), (31157) ), again with thin layers of sediment between them ( (31151), (31153), (31156) ). Many of

these layers are only preserved in patches.

Under the plaster floors, deposits with many well preserved artefacts were excavated, including a few datable bones. We also found what could be remains of a floor layer predating the stack of plaster layers: a thick layer of greenish-grey clay with large vegetal voids (31255) preserved alongside the southern facade of buttress F.3376, and especially in the corner of F.3376 and the wall F.3358. Floors ( (17277), (17294) ) made from this material were found in neighbouring Sp.345 last season.



## Building 105



Figure 5.13. Overview photo of B.105 at the end of the 2013 season. Photography: Jason Quinlan

Further excavation of **(1) the deposits filling the building,** and **(2) strategic sections cut into the construction features** solved many questions about stratigraphy that came up during the last season.

**(1) Room fill excavation** last year had reached, under thick packages of rich middens that were excavated 2008-2012, a substantial layer of erosion debris (2012: (18364), (18370); 2013: (18396), (18399), (31100), (31141), (31210); total thickness up to

1.3m). This debris layer contained (exclusively) the materials that the features of B.105 were made of (white marl, dark grey brick material) and is therefore interpreted to be a primary deposit – erosion from the surrounding walls. This is the first time we were able to identify an erosion layer *in situ*. This erosion process seems to have been going on over a longer period of time, as is indicated by the fact that some isolated and clustered artefacts are also present in this debris package. This year, a small cluster of pot sherds (31216) was excavated between the building debris in the northwest corner of the building.

The debris package overlay a curious arrangement in the central part of the building: a rectangular part of a wall (18372) with a large ground stone next to it. The wall piece was from the same dark grey brick and white mortar as the surrounding walls. It most probably was not constructed *in situ*, as the bricks were standing upright. Rather, this seems to be a secondarily used part of a wall, possibly cut to be so neatly rectangular, and placed carefully in its current location without any cracks occurring. The large stone (31210.x1) next to it is the heavily used and abraded rest of a large grinding support (see Brady, this report). Both objects appear deliberately placed, as they are very close and one edge of the stone is actually protruding 7cm deep into the wall. Many preliminary ideas were discussed what this installation could have been used for, grinding while sitting on the wall as a bench being one of them. The fact that the wall is secondarily used and the grinding stone probably had a long use life before it became part of the installation support the impression that this was an ad-hoc arrangement.

After the stone-wall installation was removed, a sondage was dug in the eastern half of the central space in B.105. It turned out that the installation had been sitting on a mixed layer containing high amounts of an otherwise rarely found heavy, sticky dark red clay ( (31221), (31224) ). This layer



contains few artefacts and runs under the base of buttresses F.3353 and F.3366 which are located next to the sondage – presumably also under other walls and buttresses outside of the sondage area. The distinct red clay and the low amount of artefacts led to the hypothesis that this red layer might be a deliberate filling-levelling event predating the construction of the house. Under it, a thin layer with very high amounts of marl was found, the marl content leading to an overall whitish colour of this layer (31238).

Directly under the white layer, we came down to a grey layer whose matrix, artefact spectrum and amount are like that of many deposits we found inside the buildings. We therefore interpret this layer (31239) as room fill between walls of an earlier architectural phase, which pre-dates buttresses F.3353 and F.3366 and maybe the entire B.105.

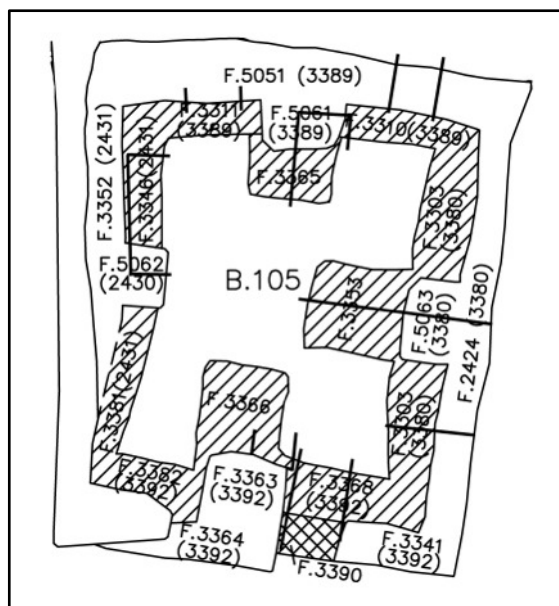


Figure 5.14. Plan of B.105 showing sections cut into construction features. Plan: Patrick Willett, Jana Rogasch

(2) We worked further on **clarifying the sequence** in which the many buttresses and walls of B.105 were constructed. The building is unique insofar as it consists of what looks like two concentric rings of construction features – all walls and buttresses are present twice, but the outer ring is higher. After this was discovered last year, we formulated three hypothesis on how the features might relate stratigraphically: 1. the outer walls were built on top of thick walls, thus are younger; 2. the inner (lower) walls were built against the outer walls, possibly as a support – thus the outer walls are older; 3. all construction features were built at the same time as part of a two-storeyed building with thick walls surrounding the basement and thinner walls for the upper storey.

Removal of strategic parts of construction features was found to be an effective means of stratigraphic research last season; in B.105, we targeted the buttress-wall connections.

**Eastern walls and buttresses.** A section was cut in east-west direction through half of the buttress and half of the related wall, ca. 90cm down to reach the upper part of the lower buttress. We found that the well preserved, high wall F.2424 was constructed on top of a thick wall made from two parallel rows of brick (F.3380). The interface between those two walls is indicated by a very thin layer of whitish sediment visible in section between two brick layers. The spacing of the brick and mortar layers is however very regular, so that no break is obviously visible in the wall. This might have been intended by the ancient builders.

As F.2424 is only about half as thick as F.3380, a ledge was created towards the inside of the building. For unclear reasons, small wall features with a preserved height of two brick rows (F.3303 south of the buttress, F.3398 north of the buttress) were constructed on top of this ledge, abutting

the very well preserved plaster of F.2424 and buttress F.5063. Potentially this served as a capping to even out the top of older wall F.3380.



Figure 5.15. Section through F.3380 and F.2424 with black line indicating interface between walls  
Photography: Jana Rogasch.

The younger wall F.2424 is bonded to the upper, smaller buttress F.5063. The brick and mortar layers are continuous, and to make things even clearer, there was a continuous phytolith layer under one brick that ran from the wall into the buttress. The phytoliths indicate that organic material was applied here during construction, and decayed under protected conditions inside the wall.

The lower wall F.3380 is bonded to the larger lower buttress F.3353. The upper buttress F.5063 was constructed on top of F.3353. In section, the boundary between these two features was not visible, as again the spacing of brick and mortar layers was regular.

**Northern walls and buttresses.** Results here confirmed those from the eastern wall. The eastern halves of the two buttresses were cut back from the front, to create both an east-west and a north-south section through the features. Just as in the case of the eastern buttress, the facades are not well preserved, so that it is not possible to draw a clear line between them from the outside. This distinction did not become clearer after sectioning. However, the upper four

courses of bricks had a slightly lighter grey colour than all bricks underneath. This could be a result of them having been exposed and drying out for longer, but we wetted them several times over a few days and the colour difference remained. It is therefore likely that these four upper brick courses represent the upper buttress F.5061. Apparently the two buttresses were built with similar, but slightly different brick recipes. This indicates a certain time span between their construction.

The northern wall was investigated via several smaller sections, for which we could use cuts created by late pits. The sequence is identical to that in the east: On top of a thick wall made from two parallel rows of brick (F.3389), a thinner wall (F.5051) with buttress F.5061 was constructed, plastered, and then the ledge capped with more brick material which here is very irregularly preserved and only up to one brick course high (F.3311 west of the buttress, F.3310 east of the buttress).

**Western buttress and wall.** The western side of the building seemed to have only buttress F.5062, which is similar to F.5061, F.5063 and F.3363 in size and preserved height and therefore probably functioned together with them. This buttress was ca. 2m high, one reason to suspect it might in fact be a patchwork, the result of multiple construction events. We cut a section that halved F.5062 and included a large part of wall F.3346 north of it. Unfortunately, this section could not include the higher wall F.3352 parallel to F.3346, which was not feasible for reasons of health and safety.

The section created by this cut (Figure 18) is interesting for many reasons. First, the construction techniques used to make the features became much better visible: The layers of dark grey 'brick' and white marl 'mortar' are undulating, some do not go all the way through the wall. There are two layers of red brick material between the typical dark grey bricks. We therefore interpreted these to be pseudo-brick constructions (see B.107 discussion for definition).

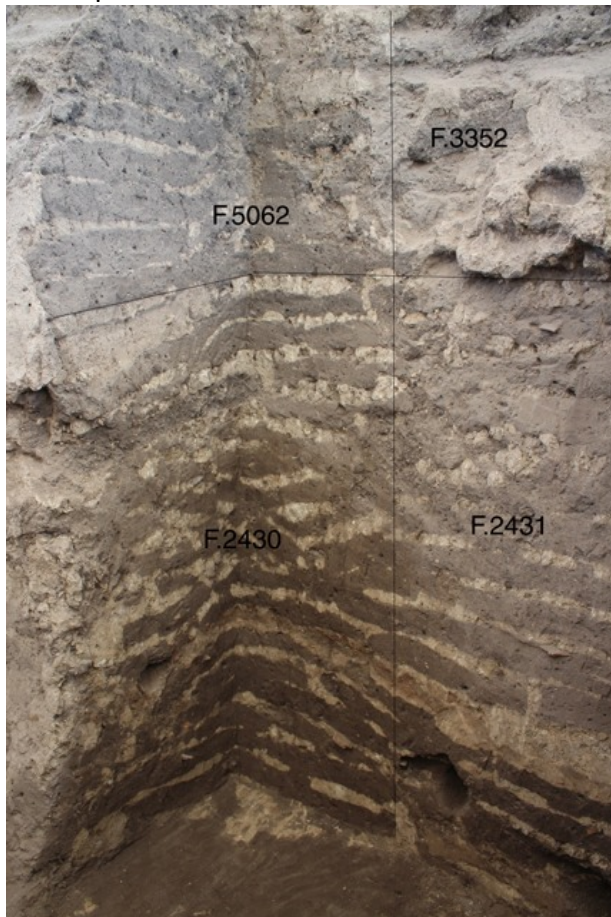


Figure 5.16. Sections of western walls and buttresses. The vertical lines indicate where the buttresses would have started protruding from the walls before we removed this part. Note the eroded plaster (31116) on F.3352 which had been abutted by F.3346 which was removed before this photo was taken. Photography: Patrick Willett

Upon closer observation of the section through F.5062, it appeared that the upper part of this features, nine brick courses high, was built much more regularly than the lower part – possibly with dried bricks rather than 'pseudo-bricks'. This is a very strong indication for two different construction phases.

During removal of F.3346, we had uncovered heavily eroded plaster (31116) on both F.5062 and F.3352, which was abutted by F.3346, indicating that the latter was constructed last. However, this plaster did not go all the way down, in fact the plastered part is only ca. 30cm high and the lower parts of the wall and buttress are clearly bonded. Also, the top of buttress F.5062 (facade towards the room) was covered in thick plaster, which however stopped on roughly the same level as (31116).

Summarising all these observations, although the layout of wall features looks different, the construction sequence is identical to that in the north and east: a thick wall F.2431, bonded to buttress F.2430 (which however is smaller than its brother-buttresses F.3353 and F.3365), onto which buttress F.5062, wall F.3352 and ledge-capping F.3346 were built later.

construction sequence is identical to that in the north and east: a thick wall F.2431, bonded to buttress F.2430 (which however is smaller than its brother-buttresses F.3353 and F.3365), onto which buttress F.5062, wall F.3352 and ledge-capping F.3346 were built later.

**Southern buttresses and walls, and the 'door opening'.** The walls in the south were built in an identical sequence to the rest of the building: a thicker wall F.3392 onto which a thinner wall (F.3364, F.3341) was constructed, and the ledge covered with two courses of bricks (F.3368).

The upper south wall (F.3364, F.3341) features a rarity: an opening, which is clearly deliberate, as both its bottom and its sides were plastered. The badly preserved wall F.3345, belonging to a building south of B.105, would have blocked this entrance and is therefore interpreted to be a later construction. This doorway was remodelled at some point: a small construction, two brick courses high (F.3390) was put on top of the plastered bottom (31278), and plastered over again (31226). This raised the level of the threshold by ca. 30cm.

The upper wall F.3364 is connected to buttress F.3363. The buttress F.3363 has well preserved plaster on its northern facade, two layers were recognisable ( (31193), (31195) ). On 31193, a long vertical ridge of plaster was found (31194) that is interpreted to be the rest of a not identifiable installation. The lower part of these three plaster layers was hidden behind the lower buttress F.3366. As this buttress abuts the plaster of the upper buttress, F.3366 was clearly constructed later than F.3363 – after a period of time long enough to re-plaster the latter, attach an installation to it and remove it again. This situation is clearly dissimilar from the rest of the building, where the upper, smaller buttresses were found to be younger than the larger, lower buttresses. Interestingly, there is a small but well preserved rest of plaster (31279) in the corner of wall F.3392 and F.3366, indicating that the wall, which is older than all other construction features found in this area, at some point was used together with the thick buttress which is the youngest of all features.

**Summary of B.105 stratigraphy.** To summarise, the sections made during the 2013 season brought the desired clarity. We can identify two phases of a building whose older and thicker walls were topped up with thinner walls at a later point. The southern buttress F.3366 was built in a third phase of construction. The two first phases are further distinguished by building technique, as it seems that the older features were constructed with the ‘pseudo-brick’ technique, while the younger ones, best visible in F.2424, could be real brick walls.

The practice of building new walls on top of older ones is seen throughout the trench, but in this case seems to have had different results. The original building seemingly had no buttress in the south, and only a small buttress in the west, but two very thick buttresses in the north and east. After the first remodelling, the asymmetry remained as the size of the western buttress never changed and there was only one, thin, buttress in the south. The south was then remodelled again to look like the northern and eastern part.

In the light of this sequence, it is not unlikely that we indeed have proof for B.105 having been a two-storeyed building after the first remodelling: the lower thick walls surrounding the basement, the upper walls surrounding the first floor with similar layout, but greater internal area because walls and buttresses were thinner. The large buttresses of the basement would have carried a floor located at the base of the upper walls, of which we might have small parts of the plastered floor connection preserved on the walls. The hypothesis of two storey buildings on the West Mound can only be verified in the post-excavation analysis.

### **Trench closing works**

Four days in the end of the season were dedicated to preparations for the permanent closing of the trench. The tent, the sandbags that secure the tent, the sieves, all metal stakes, in short all the leftovers of years of archaeological work were cleared away. We took overview photos of the trench and surroundings with a cherry picker machine from a local electricity company. Afterwards, all construction features were wrapped in geotextile, which was secured with sandbags placed on the wall tops and in corners. We sprinkled Efes bottle caps over the entire trench to mark the horizon



for possible future archaeologists. Jason Quinlan supervised the infilling with soil from the spoil heap, done by a JCB machine provided by Konya Şeker.

### **Acknowledgments**

We would like to thank the University at Buffalo, several private donors and the Çatalhöyük Project for their continuous support. As always, deep gratitude is owed to all team members including our workmen from Küçükköy for their enthusiasm and outstanding work. A special thanks to the West Mound Project digital media specialist Patrick Willett for his digital documentation work during the season and his input during the preparation of this report. Thanks to Ashley Lingle, Yıldız Dirmit, Levent Özer and Jason Quinlan for their help with various practical things throughout the season and especially during the preparation of the trench closing.



Figure 5.17. Overview of the West Mound Trench 5, before closure. Photography: Jason Quinlan

## 6. Çatalhöyük Human Remains Team Archive Report 2013

Christopher Knüsel<sup>1</sup>, Scott Haddow<sup>2</sup>, Joshua Sadvari<sup>3</sup>, and Barbara Betz<sup>3</sup>

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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 often in the context of sex determination or description of 'facing' (i.e. orientation of the viscerocranium) and refers to both the cranium and mandible.

### Introduction

During the 2013 field season, the Human Remains Team (Larsen, Knüsel, Haddow, Sadvari, Glencross, Betz, Kurt, and Nugent) 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 and conference presentations (Society for American Archaeology (SAA) and European Association of Archaeologists (EAA), 2014, which will take place in Istanbul), and held regular meetings with team leaders from other on-site labs to continue to facilitate the integration of analyses between labs during the final phase of the Çatalhöyük Research Project. After pioneering the method last season, Scott Haddow continued to produce 3D models of all excavated burials.

Several research projects were initiated or continued during the 2013 season:

With funding from the British Academy, Christopher Knüsel, with Jacqui Mulville and Jennifer Jones of the Faunal Remains Team, completed the recording of the commingled human and animal bones from the KOPAL Trench, excavated in the late 90s, using a zonation method that permits direct comparison of the remains, despite differing morphology, and study and recording of surface modifications deriving from their taphonomic history. Cutmarks were identified on two human specimens, as well as evidence of dry fractures, animal gnawing, burning, and root erosion. In association with the Conservation Laboratory (Ashley Lingle and team) and site illustrator Katy Killackey, the Human Remains Team also replicated the method for making the handprints that occur in, for example, Building 77 and acquired scans and prints of the right hands of 63 volunteers from the site's complement. These will be used to engender the prints. Bonnie Glencross and Christopher Knüsel, with Selin Nugent, began a project focused on reconstructing many of the fragmentary crania and systematically recording evidence of cranial trauma. Using a standard zonation recording of the cranium and mandible derived from medico-legal studies, they recorded 20 individuals with blunt force cranial trauma (Table 1), all of which was antemortem and healed indicating that the individuals had survived these injuries for some time. No evidence for perimortem fractures (i.e., occurring at or around the time of death) has yet been found at the site.

<b>Skeleton Unit Number</b>	<b>Excavation Year</b>	<b>Crate</b>
1424	1996	HB 15
1924	1996	HB 10
1928.B2	1996	HB 8
1995.B2	1997	HB 20
2058	1997	HB 23A
2115	1997	HB 2
2169	1997	HB 3
3368	1998	HB 25B
4615	1999	HB 35A
5818	2002	HB 77A
6303	2000	HB 41B
8584	2002	HB 82
10813	2004	HB 118
10834	2004	HB 120
10840	2004	HB 119
14167	2006	HB 169B
16513	2008	HB 221
17485	2008	HB 227
18645	2011	HB 252
20682	2013	HB 276

Table 6.1. Individuals identified during the 2013 field season exhibiting evidence of cranial trauma. Laboratory analysis of cranial trauma will continue in 2014.

The Funerary Archaeology component of the Human Remains Team (Haddow, Sadvari, Knüsel, and Kristina Jonsson) discussed a joint project with Lynn Meskell and Carrie Nakamura using the site GIS (in collaboration with Camilla Mazzucato) to take a biocultural approach to funerary treatment at Neolithic Çatalhöyük, one linking the analysis of skeletal remains of the deceased - aspects of social identity (age, sex), palaeopathology and well-being (as indicated by growth and development) - with grave location, burial inclusions (i.e. found in the fill of burials), and grave goods, such as items of personal adornment and those directly associated with the skeleton. The longer-term plan is to link this project with one based on the evidence for burial treatment and manipulation of the deceased, exploiting specifically the tertiary remains at the site and to emulate the results of the KOPAL Trench analysis.

Joshua Sadvari spent parts of the 2013 season continuing data collection for his doctoral thesis, which focuses on the reconstruction of activity and workload among the site's Neolithic inhabitants based on patterns of extramasticatory (non-dietary) tooth wear, osteoarthritis (degenerative changes of the joint surfaces), and enthesal changes (degenerative changes at the site of muscle attachments). As was the case last season, Josh was heavily involved in lifting skeletons in the North, South, and TPC Areas of the site.

Barbara Betz worked on the neonate remains lifted *en bloc* last season from Building 77, identifying remains of matting and phytoliths. This neonate and its surrounding burial context will be conserved as a permanent feature for display, further analytical, and teaching purposes. Barbara also worked

widely lifting skeletal remains in both the North and South Areas, as well as in the area excavated by James Mellaart in the 1960s and which is currently being further excavated by Marek Baranski. She, Selin Nugent, and Cansu Kurt, aided by student volunteers, also cleaned, inventoried, and curated remains in the laboratory throughout the season.

Jessica Pearson spent part of the season in the Human Remains Lab preparing a sample for export to continue her research into the stable carbon and nitrogen isotope ratios of the Neolithic inhabitants of Çatalhöyük as they relate to diet. Jessica is also working closely with Scott Haddow and Josh Sadvari on an analysis of two potential twin pairs, based on multiple lines of evidence including isotope ratios, mortuary context, and palaeopathology. In addition, Jessica will be working closely with the Human Remains Team in upcoming seasons on a collaborative effort to analyze isotopic signatures derived from dental calculus.

Michelle Gamble and Sophie Moore spent the latter part of the season in the Human Remains Lab continuing their study of the Post-Chalcolithic cemetery at Çatalhöyük. Eight days of field-walking were conducted, covering an area of two square kilometers, to survey the location of potential settlement sites associated with the Roman, Byzantine, and Islamic burials on the East mound. At present, completed inventories, age and sex estimations, and palaeopathological analyses have been undertaken on 80 Post-Chalcolithic burials excavated from the North Area between the 2003 and 2008 seasons.

By the end of the 2013 excavation season, the skeletal remains of at least 36 individuals were excavated: 23 Neolithic individuals from the North Area, eight Neolithic individuals from the South Area, and five 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.

### **North Area Neolithic burials**

#### **Building 52, Space 94**

The remains of at least five individuals were recovered from the northeast platform (F.3695) and at least seven individuals from the northwest platform (F.3694) of Building 52.

#### ***Northeast platform F.3695***

*F.7112, Sk (20655), Cut (20648), Fill (20650, 20651, 20654)*

Sk (20655) is the last in the sequence of burials recovered from the northeast platform of B.52 (Fig. 6.1). The poorly preserved primary undisturbed skeleton is that of a middle adult female placed in a tightly flexed position on its left side with the head to the west and the feet to the east. The age of this individual was determined by the degenerative changes of the pubic symphysis and auricular surface. The neck was flexed and rotated to the left such that the skull faced northeast. The viscerocranium (facial skeleton), shoulders and upper thorax were obliterated by rodent burrows. The left shoulder was rotated medially and adducted, with the elbow loosely flexed and the forearm pronated across the abdomen. The left wrist was extended and the hand was pronated across the





Figure 6.1. Burial F.7122 with primary adult (20655). Photography: Scott Haddow

right ilium. Rodent disturbances have obscured the original orientation of the right arm and elbow, but the forearm was pronated across the thorax, which indicates that the right elbow was more tightly flexed than the left elbow; the right wrist was also extended. Both lower limbs were tightly flexed against the body such that the knees were close to where the mandible should be. Both feet were dorsiflexed against the east wall of the grave cut without rotation of the ankles.

Thin bands of phytolith were found running across the ankles, right proximal femur and underneath the left ilium. This likely indicates that the body was tightly wrapped in reed cordage when it was placed in the grave cut. Two mollusc shells (20654.x2, x3), one containing red ochre, were found in the north part of the grave cut beside the lower limbs.

Despite being the last burial in platform F.3695 and thus the shallowest interment, Sk (20655) was not affected by the fire which consumed B.52 at the end of its occupation. There are no heat-related color changes to the bone and no traces of soft tissue were found within the endocranium or anywhere else on the skeleton. This implies that the interment of Sk (20655) within the northeast platform took place well before the fire, allowing sufficient time for the soft tissues of the body to fully decompose.

*F.7120, Sk (30522, 30523, 20661, 30521), Cut (30517), Fill (30518)*

Burial F.7120 was located immediately below burial F.7112. The burial cut (30517) contained the primary undisturbed skeleton of a middle adult male Sk (30522) and the primary disturbed skeleton of an infant Sk (30523). The age of the adult was determined by the degenerative changes of the pubic symphysis and that of the infant by the development of the dentition. Both individuals appear to have been interred in a single burial event. The infant was placed directly on top of the adult (Fig. 6.2) and was slightly disturbed by the bottom of the grave cut (20648) for the later burial F.7112 due to its higher elevation in the grave.

The adult male Sk (30522) was tightly flexed and laid on its back, slightly leaning on its left side (Fig. 6.3). The head was oriented to the west and the feet to the east. The neck was flexed and rotated to the left such that the skull faced northeast. The viscerocranium has been disturbed, likely as the result of rodent activity. The left shoulder was medially rotated and adducted, with the forearm supinated, wrist extended and the hand supinated and extended underneath the left foot. The right shoulder was also medially rotated and adducted, with the forearm pronated, wrist extended and



Figure 6.2. Burial F.7120, with primary adult (30522) and primary disturbed infant (30523). Photography: Scott Haddow



Figure 6.3. Burial F.7120, with primary adult (30522). Photography: Scott Haddow

the hand extended and pronated above the right hip joint. Both lower limbs were flexed on top of the body (leaning to the left side of the body) and the feet were extended in plantarflexion.

The infant Sk (30523) was placed on its left side in a loosely flexed position directly on top of the right lower limb and *os coxae* of the adult male. Its head was oriented to the west (facing upwards) and the feet were oriented to the east.

Given the disturbance to this individual by the grave cut for the later burial F.7112, it was difficult to determine with any certainty the precise orientation of the limbs.

Three rows of small stone disc beads (30518.x1, x3, x6) in various colors were found on the abdomen along with an additional string of similar beads around the left ankle. Traces of red pigment were observed on the frontal bone and two green stone beads (30518.x4, x5) (possibly serpentinite) were also found, one on either side of the temporal area of the cranium.

The disarticulated remains of at least two additional individuals were also found within the fill (30518) of burial F.7120. Sk (30521) is represented by a cranium and mandible of a child. The child's skull

was laid on its right side (facing west) directly beside the cranium of Sk (30522). A pair of disarticulated tibiae, humeri and a femur, all potentially belonging to the same child, were also recovered in the lower grave fill directly above the primary adult male and infant. A second cranium and mandible Sk (20661) belonging to a young adult (possibly female) were recovered from the upper grave fill; the bones were pushed up against the south wall of the grave cut (30517). These disarticulated skeletal elements may derive from earlier interments in platform F.3695 which were displaced and redeposited in the grave fill of subsequent burials. As such, these bones would fall into the 'primary disturbed loose' depositional category. An alternate interpretation is that these

bones were brought from another location and placed in the grave to accompany the primary burial. These bones would then fall into the 'secondary' depositional category.

An earlier burial was discovered at the bottom of the grave cut (30517) for F.7120 but not excavated in 2013 due to time constraints. As yet, no new unit or feature numbers have been assigned. The greater trochanter of what appears to be an adult right femur was exposed in the eastern end of the grave cut, while an articulated segment of cervical vertebrae was also uncovered at the western end. This would indicate that there is an earlier primary burial oriented in the same manner as the two later primary adult interments in platform F.3695. It appears that the cranium and mandible of this individual were removed when the grave cut for F.7120 was dug. It is possible that the young adult cranium and mandible Sk (20661) found in the grave fill (30518) belongs to this individual and was simply redeposited after having been displaced. We cannot be certain, however, until the excavation of platform F.3695 is completed and all skeletal remains have been recovered.

#### **Northwest platform F.3694**

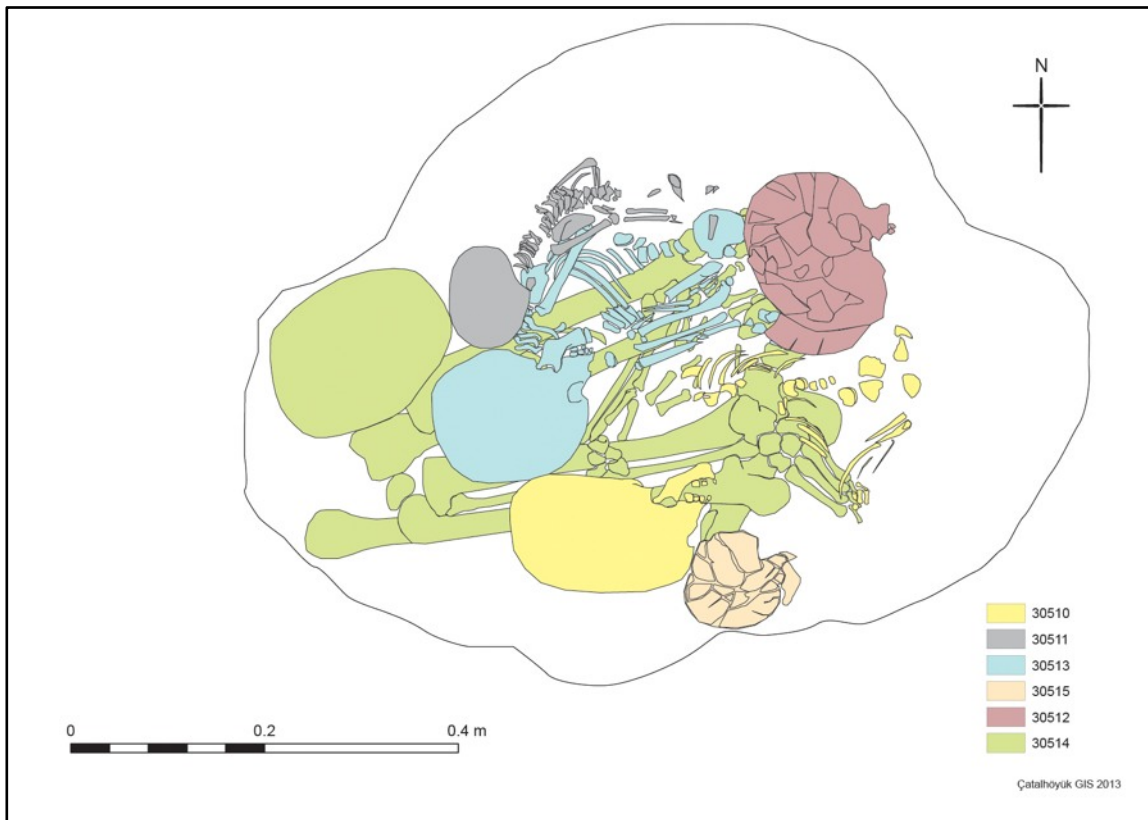


Figure 6.4. Composite plan of burial F.7127 with skeletons (30510), (30511), (30512), (30513), (30514), and (30515).  
Plan: Scott Haddow

*F.7127, Sk (30510, 30511, 30512, 30513, 30514, 30515, 30524), Cut (30502), Fill (30503)*  
Burial F.7127 was the only interment found within the northwest platform during the 2013 excavation season. It contained the primary undisturbed remains of an adult Sk (30514) and at least six subadults Sk (30510, 30511, 30512, 30513, 30515 and 30524) in various states of articulation. Disarticulated subadult bones were also found scattered in the uppermost levels of the grave fill (30503) (Fig. 6.5). Some of these loose bones have been matched in the lab with the partially articulated subadult skeletons, while others may represent additional individuals not yet accounted





Figure 6.5. Scattered subadult bones within the burial fill of burial F.7127. Photography: Scott Haddow



Figure 6.6. Overview of burial F.7127. Photography: Scott Haddow

for. No traces of earlier burials were found in platform F.3694 and, despite the condition of some the subadult remains, it appears that all of these individuals were interred in a single burial event. It appears that several of the subadults had been dead for some time before being buried with the adult. Where and for how long these remains were deposited or kept before being interred in F.7127 is yet to be determined, but in this sense, the subadults might also be considered as secondary burials or even as grave inclusions. The adult was the first individual to be placed in the grave cut and the subadults were placed on top of the body of the adult.

Sk (30514) is a middle adult possible male. The age of this individual was determined by the degenerative changes of the pubic symphysis. The body was laid on its back (i.e. supinely) in a flexed position at the bottom of the grave cut (30502) with the head oriented to the west (facing northeast) and the feet to the west. The neck was flexed and rotated to the left as a result of the back of the head resting against the west wall of the cut. The right shoulder was medially rotated and adducted, while the elbow was loosely flexed with the forearm pronated diagonally across the abdomen and the hand pronated on top of the posterior

proximal left femur. The left shoulder was also medially rotated and adducted with the elbow flexed and the forearm pronated across the abdomen. The left hand was extended and pronated across the midshaft of the right tibia. Both lower limbs were tightly flexed on top of the body such that the left knee was above the manubrium and beside the right side of the skull. The right knee was directly above the right shoulder region. The right foot was dorsiflexed and rotated laterally, while



the left foot was plantarflexed and extended without rotation. Carbonized brain tissue was recovered from within the cranial vault and the bones ranged in color from yellow-orange to gray-brown as a result of heat transference through the platform during the fire that consumed B.52. Two large red-painted mollusc shells (30503.x6, x7) were placed beside the right knee; the internal shell surfaces contained a brownish organic material. A small, flat piece of metallic mineral, roughly 20mm by 15mm and perforated at one end, was recovered in the grave fill just below the cranium of Sk (30514) and may have been worn as a pendant around the neck.

Once the body of Sk (30514) was laid in the grave cut, the first subadult to be placed with the adult was Sk (30524). Sk (30524) is that of child aged 4 years +/- 1 year (based on dental development). The body appears to have been at least partially decomposed when it was placed in the grave, as the skeleton was not completely articulated. The axial skeleton and upper left limb were laid above the adult's left shoulder in a loosely flexed, prone position with the head to the west (facing down). The upper right limb and the bones of the left *os coxae* were missing. The lower limbs were placed upright against the west wall of the grave cut immediately to the right of the adult's skull. No brain tissue was recovered from the cranium of this Sk (30524).

The next subadult to be placed in the burial was Sk (30513) a child aged 3 years +/- 1 year (based on dental development). The body was placed on its right side on top of the adult Sk (30514) in a tightly flexed position with the head oriented to the west (facing east) and the feet to the east. The neck was tightly flexed against the chest. The occipital of Sk (30513) was in direct contact with the right temporal line of the frontal bone of Sk (30514). The right shoulder was adducted underneath the body and the elbow loosely flexed with the forearm pronated and hand extended and pronated between the proximal femora. The left shoulder was adducted and the arm lay on top of the thorax. The bones of the forearm and hand were missing although they may yet be found among the loose bones found in the grave fill. Both lower limbs were tightly flexed with the knees in close proximity to the mandible. Both feet were plantarflexed with no rotation of the ankles. As a result of the fire in B.52, the bones of Sk (30513) were a deep orange color. Carbonized brain tissue was recovered from the endocranium. A relatively well-preserved circular wooden object (30513.x1), possibly a bowl, was placed on top of the cranium of this individual (Fig. 6.6).

Sk (30511), a 6-month +/- 3 months old infant (based on dental development) was placed directly on top of the body of Sk (30513) along the northern wall of the grave cut. The body was placed prone (slightly on its right side) in a loosely flexed position with the head extended and oriented to the west (face down) and the feet to the east. The right shoulder was adducted and rotated medially with the elbow tightly flexed and the forearm supinated underneath the abdomen. The left shoulder was adducted and rotated laterally with the elbow loosely flexed. The supinated left forearm was extended towards the left *os coxae*. The precise orientation of both hands could not be determined. Both lower limbs were loosely flexed with the knees extending downwards into the grave cut. The precise orientation of the feet could not be observed. In terms of heat alteration, the bones from the upper half of Sk (30511) are orange-brown in color, while the bones from the lower half of the body are blackened and partially calcined. This is likely due to the proximity of Sk (30511) to the platform surface. In addition to carbonized brain tissue recovered from the endocranium, carbonized soft tissue was also recovered from the abdominal region. A large amount of well-preserved linen textile (30503.x9) was found immediately below Sk (30511) and above Sk (30513),

along with traces of cord, which may have been used to bind the infant's body. Two green stone beads (30503.x2, x3), identical to those found with Sk (30523) and in the same anatomical location (i.e., one on either side of the temporal region of the cranium), were also found; these may have been earrings.

Sk (30510) is a 4 years +/- 1-year-old child (based on dental development) whose partially complete skeleton was placed on top of the adult Sk (30514) just south of Sk (30513). The body was laid on its right side with the head flexed and oriented to the west (facing east). Only the axial skeleton was articulated, however; some of the bones of the upper and lower limbs were dispersed in the grave fill above the articulated skeleton. A small amount of carbonized brain tissue was recovered from the endocranium and the bones of this individual were a dark brown color as a result of heat alteration. Given the partially articulated state of Sk (30510), it would appear that the body was in an advanced state of decomposition when it was interred. Traces of textile cord/bandages (30510.x1) were found running from the top of the cranium to the underside of the mandible and may have been used to bind the cranium and mandible together.

Sk (30512) is an isolated cranium of a child, 4 years old +/- 1 year (based on dental development) found in the northeast corner of the grave cut (30502) above the left foot of the adult Sk (30514). The cranium was lying on its left side and facing northeast. The bones were a blue-brown color as a result of heat alteration. Unlike the other crania recovered from burial F.7127, Sk (30512) was crushed flat and shattered and the single-rooted teeth were missing post-mortem. This suggests that the cranium was already skeletonized when it was interred in F.7127. Without soft tissue to support it, the cranial vault would have collapsed under the weight of the overlying grave fill. Despite this, a small amount of carbonized brain tissue was recovered from the endocranium. It is possible that this subadult cranium had been retrieved from a previous primary interment before being redeposited with the adult skeleton as a sort of grave inclusion.

Sk (30515) is the partial cranium and mandible of a child, 5 years old +/- 1.5 years (based on dental development) found in the fill above the right *os coxae* of adult Sk (30514) against the south wall of the grave cut. Only the left side of the cranium (parietal, frontal, maxilla) and mandible were recovered. Sk (30515) is similar to Sk (30512) in terms of coloration (blue-brown). We originally believed that this individual, along with Sk (30512), and other disarticulated bones found in the grave fill, may represent primary disturbed loose bones from earlier burials in platform F.3594, but upon full exposure of F.7127, it was clear that no earlier grave cut or primary disturbed burials existed.

While attempting to associate the loose, disarticulated bones found in the grave fill of F.7127 with the partially articulated subadults Sk (30510, 30512, 30515, 30524) it became clear that there may actually be at least two additional subadults present in burial F.7127. These are represented by two sets of right and left femora and several bones of the upper limb whose shaft length measurements provide age estimates which are at least two years younger than any of the partially articulated skeletons. More work is required in the lab, but it does appear that the bones of at least eight subadults were interred with the adult Sk (30514) and that only two of these, Sk (30511, 30513), were fully articulated (and perhaps only recently dead?) when they were interred. The others

appear to have died much earlier and had either been put aside (stockpiled?) or retrieved from another burial or burials before being (re-) interred with the adult.

Finally, while cleaning up the north part the grave cut (30502) bottom after the human remains had been removed, a complete marble bracelet(?) (30503.x8) was found close to a rodent burrow. It was not directly associated with any particular skeleton, but may have been moved from its original location by rodent activity.

## **Building 77, Space 336**

### ***North platform F.6062***

*F.3642, Sk (19494), Cut (19495), Fill (19471)*



Figure 6.7. Burial F.3642, a neonate (19494) within a reed basket. Photography: Scott Haddow

Burial F.3642 contained the articulated skeleton of a neonate buried within what appears to be a folded reed mat. The neonate and mat were block lifted by the Conservation Team in 2012 and micro-excavated in the Human Remains Lab in 2013 (Fig. 6.7). The neonate was lying flexed on its left side with the thoracic region partially prone. The precise orientation of the cranium and mandible are unclear because the skull was crushed. The right shoulder is abducted and medially rotated, right elbow flexed at an obtuse angle, right forearm

pronated with right wrist and hand extended and pronated. The left shoulder is abducted and medially rotated, left elbow is loosely flexed, and the left forearm is supinated with the left hand supinated near the right elbow. Both hips and knees are flexed, but the left knee is tightly flexed, whereas the right knee is only slightly flexed and appears somewhat disarticulated. The neonate appears to have been buried sitting up or leaning against the side of the mat/burial cut, but gradually slumped into its current position as it decomposed. After more of the mat and the skeleton had been exposed, it was decided that the bones and mat should be consolidated and stored *in situ* for display, reference and educational purposes.

*F.7130, Sk (20983), Cut (20987), Fill (20930)*

F.7130 was first recognized as a depression in the surface of the north platform F.6062. It contained a cranium and mandible of a subadult Sk (20983) that was not analyzed in the lab during the 2013 season due to time constraints. The bones of this individual were an orange-brown color as a result of the burning in B.77 and heavily disturbed by rodent activity. Additional infracranial bones from an infant were also recovered from the grave fill (20930) but not assigned a skeleton number.

*F.7136, Sk (30545), Cut (30546), Fill (20947)*

F.7136 represents the primary burial of a highly fragmentary and poorly preserved subadult. The fragmentation and poor preservation were likely a result of heavy disturbance by animal burrowing. Based on the state of epiphyseal fusion and the stage of dental development and eruption, Sk (30545) was estimated to be 8 +/- 2 years of age and assigned to the 'child' age category. Sk (30545) was buried in a flexed position lying on its right side in a north-south orientation with the head to the south. The neck was flexed such that the individual was facing north-northeast. The cranium of Sk (30545) contained carbonized brain tissue, and a yellowish organic residue was identified near the pelvic girdle and sampled for future analysis (30545.s1). F.7136 is located within F.6062, the north central platform that abuts the northernmost wall of B.77 (F.3054). F.6062 lies just to the west of F.6051, which is the northeast platform containing the greatest number of burials within B.77.

***Northeast platform F.6051***

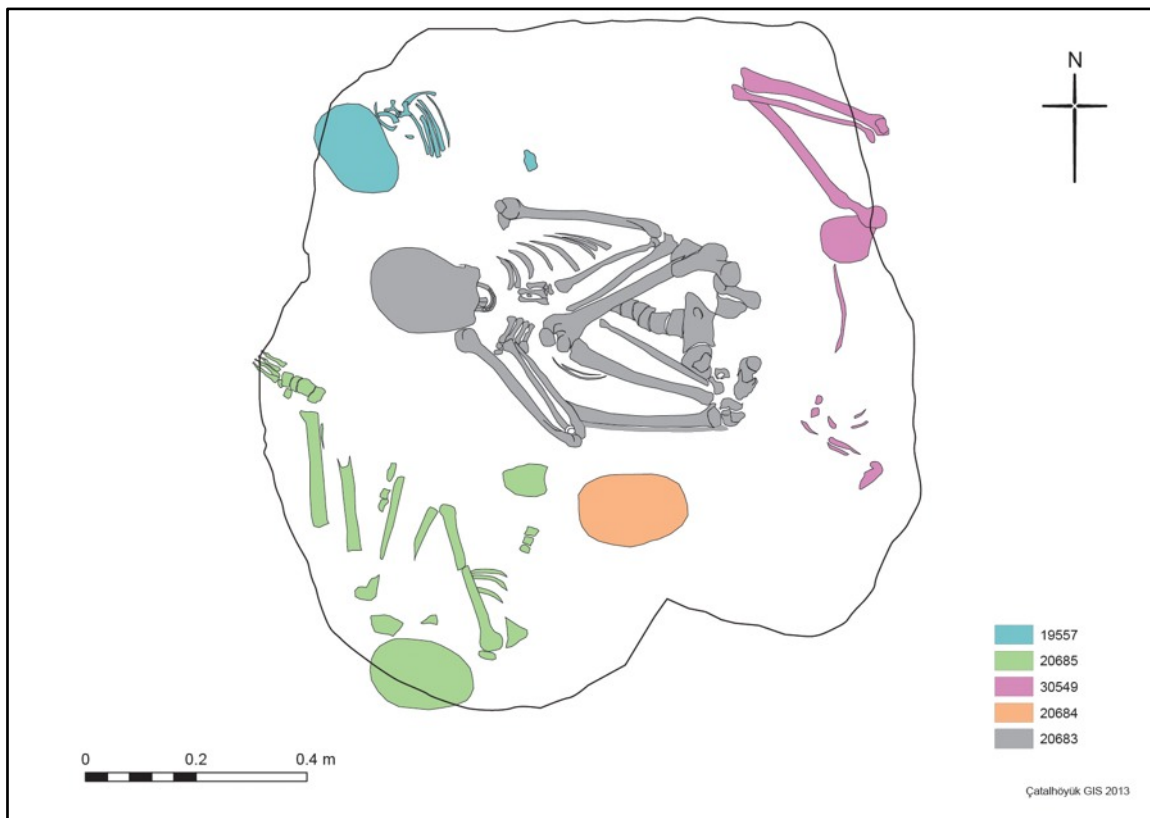


Figure 6.8. Overview of burials excavated within platform F.6051 in 2013. Plan: Scott Haddow

*F. 3697, Sk (20683, 20684), Cut (20922), Fill (20686)*

F.3697 represents the primary undisturbed burial of a middle adult female Sk (20683). The age assessment of this individual is based on changes in the pubic symphysis and auricular surface of the ilium, respectively. Sk (20683) was laid on its back in a flexed position with the head oriented to the west and the feet to the east (Fig. 6.9). The head and neck were tightly flexed against the upper chest such that the skull faced east. The right shoulder was medially rotated and abducted slightly, while the elbow was tightly flexed with the forearm pronated against the thorax. The right wrist was flexed and rotated medially with the hand pronated above the upper chest. The left shoulder was





Figure 6.9. Skeleton (20683) within burial F. 3697. Photography: Scott Haddow

medially rotated and adducted with the elbow flexed and the forearm pronated across the thorax. The left hand was extended and pronated across the upper chest. The right hip was flexed and abducted, with the knee tightly flexed and the foot plantarflexed and rotated medially. The left hip was flexed and adducted, with the knee flexed. The position of the left foot was unclear. The bones of Sk (20683) are an orange-brown color as a result of the fire that consumed B.77. The interment of Sk (20683) appears to have disturbed several earlier burials in platform F.6051 as numerous semi-articulated human bones were found at the eastern and southern margins of the grave cut

(20922). As the skeleton was not disturbed, Sk (20683) may be one of the last burials in platform F.6051, although the top of the grave cut was not clearly visible on the platform surface. Thus, an alternate interpretation is that Sk (20683) was the last in an earlier sequence of burials before the platform was subsequently built up and more burials were put in without disturbing it. However, none of the skeletal remains found above Sk (20683) during the 2011 season were undisturbed, and it is likely that these bones represent primary disturbed loose elements that were redeposited in the upper grave fill of burial F.3697.

Numerous beads of various material types were found above the body of Sk (20683) including copper (20686.x10), stone (20686.x5, x6, x8, x9, x14, x19, x20, x21), bone (20686.x1, x2, x3, x4, x13, x16, x21, x26) and shell (20686.x12, x15, x17, x22, x23, x25). A small worked stone (20686.x11) and a presumed stalactite (20686.x7) were also recovered. Many small black beads were found near the cranium of Sk (20683) and may have been part of a necklace. The skeleton (20683) rested upon an orange organic material which may represent decomposition fluids from the body that have been preserved as a result of the burning in B.77.

Sk (20684) is an isolated cranium belonging to an adult of indeterminate sex. A more precise age estimate for this individual could not be provided due to a lack of diagnostic elements. It was found in the southern part of the grave cut (20922) beside the right leg of Sk (20683). The cranium was lying on its left side facing east and was crushed flat by the weight of the grave fill, which implies that it was already skeletonized when it was placed in the grave cut. Sk (20684) may represent a primary disturbed loose cranium displaced by the interment of Sk (20683), but the lack of a mandible, cervical vertebrae and anterior dentition strongly suggests it was a curated object that

was intentionally placed in the grave to accompany the primary adult female at the time of burial, thus representing a secondary deposition.

*F.7132, Sk (19557), Cut (30540), Fill (20688)*

F.7132, a primary disturbed subadult burial located in the northernmost area (see Fig. 6.8) of platform F.6051, was partially exposed during the 2011 season but left unexcavated due to time constraints. The burial was fully exposed and excavated in 2013. Only the cephalic extremity, upper thoracic vertebrae, clavicles, right humerus and right ribs were left *in situ*. Sk (19557) is that of a child 5 years old +/- 1 year (based on dental development). The body was placed on its right side with the head oriented to the west (facing south). The orientation of the rest of the skeleton is impossible to determine. It appears that F.7132 was disturbed by the later cut (20922) for F.3697 located immediately south of F.7132 and possibly by the cut (30574) for F.7137 to the west. This would make F.7132 one of the earliest burials in platform F.6051.

*F.7133, Sk (20685), Cut (30541), Fill (20989)*

F.7133, located in the southwest corner of platform F.6051, is a poorly preserved primary disturbed burial containing a possible male Sk (20685) (see Fig. 6.8). Based on the epiphyseal fusion state of the extant bones, this individual is an adult, but a more precise age estimate cannot be provided due to preservation factors and the incomplete nature of the skeleton. The body was flexed on its left side with the head to the south and the feet to the north. The head was flexed against the upper chest such that the skull faced northwest. The right shoulder was adducted without rotation and the elbow was flexed at 45° with the forearm pronated against the thorax. The orientation of the right hand, as well as the left upper limb, could not be determined due to the later disturbance(s) to the skeleton. Both lower limbs were flexed towards the body with the knees flexed at less than 45° and the right foot was plantarflexed without rotation of the ankle. The orientation of the left foot could not be determined. Sk (20685) was truncated in the region of the pelvis and proximal femora by the grave cut (20922) for burial F.3697. Heat transference through the platform during the burning of B.77 has given the cephalic extremity a dark brown color, while the rest of the skeleton is a lighter orange-brown color.

The cranium of Sk (20685) was caked in a thick layer of red pigment, which was later identified as cinnabar (HgS) through pXRF analysis. In addition, this individual was buried with a number of grave goods including a cowrie shell bead bracelet (20685.x1) on the right wrist and two boar's tusk 'pendants' (20989.x1, x4) found above the right shoulder. An obsidian point (20989.x2), and additional beads of stone (20989.x3, x5, x7) and shell (20989.x6) were also recovered from the grave fill. A well-worn adult third maxillary premolar was also found in fill (20989).

*F. 7137, Sk (30549), Cut (30574), Fill (30548)*

F.7137 is a disturbed primary burial of an adult Sk (30549) located under the western extreme of platform F.6051 (see Fig. 6.8). Sk (30549) is missing the cephalic extremity, as well as the right upper limb elements; only the torso, lower limbs, and left humerus were found *in situ*. The body was oriented with the feet to the north and the head to the south. The left forearm of this individual was not located, but the elements of the pectoral girdle and humerus were present on that side. These remains, then, may be those associated with the cranium, mandible, and cervical vertebrae 1-6 of Sk (19500), with carbonised brain tissue within the vault, which was removed in 2011 by Lori Hager.

Sk (30549) was buried prone with the lower limbs flexed at the knees and hips such that the feet were uppermost and directly beneath the platform, undercutting it. A second left foot was found largely articulated and presented the plantar surface uppermost, near the right knee of Sk (30549); this, along with a partial right foot found in fill (30548) belongs to a second and likely the same individual. Partial and disturbed remains of a child also found in fill (30548).

*F.7309, Sk (30173), Cut (not assigned), Fill (30154)*

F.7309 represents a Neolithic burial within platform F.6051 that was identified in the final days of the 2013 excavation season. This feature was not excavated and will require attention early in the 2014 season. No cut number has yet been assigned to this feature.

## **Building 102**

*F.3691, Sk (20609), Cut (None), Fill (20608)*

F.3691 consists of the skeleton of one subadult individual (Sk 20609) and an arbitrary fill layer (20608). No cut was identified during the excavation process, and it is possible that this individual was deliberately placed directly into the room fill (20481) as opposed to within a proper burial feature (i.e., one that includes a burial cut). Directly beneath F.3691 is an ashy layer (20622) containing a mixed deposit of faunal (bovine horn core) and human remains. F.3691 is located in an entranceway or opening between Sp.17 and Sp.18 and in this regard may represent a threshold deposit. The remains of Sk (20609) were first encountered when straightening a section for F.3688, and this disturbance precludes a detailed discussion of burial position, although this individual appears to have been lying on its left side with the head to the west and facing north. Based on dental development and eruption, Sk (20609) was estimated to have died just around the time of birth (+/- 2 months) and assigned to the 'neonate' age category. Long bone measurements of the clavicle and humerus are consistent with an age ranging from 40 weeks (prenatal development) to one month (postnatal development). Therefore, this individual died very shortly after birth and may even represent fetal remains that did not reach full term.

*F.7134, Sk (20998), Cut (20997), Fill (20991)*

F.7134 is the primary burial of a partially complete and fairly well-preserved subadult (Fig. 6.10). During excavation, a small burial cut (20997) was recognized cutting into units (20993) and (20957) of F.3699 when a patch of floor (20986) was removed by excavators. The burial appears to have been made during a remodelling phase of a basin feature (F.3699), during which the basin itself was made smaller. This burial could be interpreted as a foundation burial in that the individual was interred prior to the completion of the major remodelling of Sp.17, and prior to a new phase of use for F.3699.

Within the cut, a well-preserved neonate individual Sk (20998) was placed in an east-west orientation. The individual was partially reclined in a semi-supine position with cranium, mandible and upper trunk resting against the western wall of the cut. Excavators encountered the cranium at a depth of approximately 6cm below the top of the burial cut. The neck was flexed anteriorly and laterally so that the side of the cranium rested on the left shoulder facing east. The individual appears to have been placed into the cut in a semi-upright seated position. The positions of the ribs, vertebrae, and skull indicate that the individual's trunk gradually slumped to the left within the



Figure 6.10. Burial F.7134, skeleton (20998). Photography: Scott Haddow

burial cut during decomposition. The right arm lay extended alongside the axial skeleton, with forearm and hand pronated. The left forearm and hand, as well as all bones inferior to the mid-thoracic region, are missing as a result of animal burrowing. A distal end fragment of an obsidian blade (20991.x1) was found in the burial fill along the northeast edge of the burial cut next to the skeleton, and an animal phalanx was observed in the top of the burial fill.

Based on the stage of dental development and eruption, Sk (20998) was estimated to have died just around the time of birth (+/- 2 months) and assigned to the 'neonate' age category. Long bone measurements of the humerus, radius, and ulna are consistent with an age ranging from 40 weeks (prenatal development) to one month (postnatal

development). Thus, Sk (20998) died very shortly after birth and may even represent fetal remains that did not reach full term.

#### *F.7138, Sk (30589), Cut (30564), Fill (20992)*

F.7138 is the primary burial of a nearly complete and fairly well-preserved subadult. This burial feature was difficult to recognize at first, and it was not until late in the excavation process that the burial cut (30564) became clear in the bin walls of F.3698. The burial is cut into bin F.3698 and partition wall F.3688, implying that the act of deposition was associated with late or perhaps final use of the features. Burial fill was similar in composition and appearance to the building infill, which was a compound with inclusions of plaster, clay, and phytoliths. Based upon stratigraphy, fill composition, and the unusual position of the skeleton (described below), it is likely that this was not a normative, formal burial, but instead represents the deposition of a dead neonate quickly filled with infill material.

Sk (30589) was initially encountered as an apparently isolated right neonate humerus positioned with its long axis vertical, and its distal end pointing superiorly. This bone was lifted before the rest of the skeleton was excavated and photographed, but it appears to have been articulated at the shoulder joint with the arm abducted and fully-flexed prior to removal by excavators. The rest of the nearly-complete neonate skeleton was then exposed and photographed *in situ*. The skeleton was lying in a flexed position in a roughly east-west orientation. The left arm and forearm were each flexed approximately 90° at the shoulder and elbow joints, respectively. The left forearm was supinated. Both lower limbs were flexed at an acute angle at the hip. The right knee was flexed an acute angle as well, while the left knee was flexed at a larger, obtuse angle. Both feet were dorsiflexed at the ankle. Initially, it appeared that the cranium and left side of the mandible were missing, leaving only the right side of the mandible in articulation with the rest of the skeleton. After



careful excavation, however, it became apparent the individual's upper back and left shoulder were in fact resting on top of and against the cranium. The cranium was crushed and in fairly poor condition, but the neonate's trunk appears to have been lying on top of the inferior and posterior aspects of the cranium. Such a position would only be possible if the remains were interred "head first" facing east, and then the body somehow fell backward until the neck was either hyperextended or disarticulated entirely, leaving the anterior aspect of the neonate's trunk facing west. It is evident that the deceased neonate was not interred in the same manner or with the same apparent care as Sk (20609) or Sk (20998) in Sp.17.

Based on the stage of dental development and eruption, Sk (30589) was estimated to have died just around the time of birth (+/- 2 months) and assigned to the 'neonate' age category. Dry bone measurements of the maximum length and maximum width of the basilar part of the occipital are consistent with an age of less than six months from birth.

### **Building 114, Space 87**

*Sk (20682), Fill (20627)*



Figure 6.11. Cranium (20682) within room fill (20627)

Sk (20682) is represented by a disarticulated adolescent cranium of unknown sex. No cut for this cranium was visible. It seems instead to have been tossed (or placed) into the room fill (20627) of Sp.87. In this regard, it appears similar to other human skeletal remains recovered from Sp.87 during the 2012 season (see 2012 Archive Report for more details). The cranium was found lying on its left side and facing north (Fig. 6.11). Unlike crania recovered from primary burial contexts, the cranium of Sk (20682) was crushed flat. This strongly suggests that the cranium was completely skeletonized when it was deposited in the room fill of Sp.87. Without brain mass to support the endocranium, the cranial vault would have collapsed under the weight of the overlying fill. In addition, most of the single-rooted

teeth have been lost post-mortem and were not found in the surrounding fill. This implies that they had fallen out after the periodontal ligaments holding the teeth in place had decayed but before Sk (20682) was put in the ground. These observations are interpreted as evidence that Sk (20682) had been kept 'above ground' (curated) for some time and subsequently redeposited with other human and animal remains in the room fill (20627) of Sp.87 as part of the 'closing' of B.114.

## South Area Neolithic burials

### Building 80, Space 135, Platform F.3442

F.7400, Sk (20036), Sk (20039), Sk (20034), Cut (20041), Fill (20030)



Figure 6.12. Burials within platform F.3442

The following burials occur within the platform F.3442. A juvenile cranium Sk (20036) without a mandible lay in the northern part of the grave on its right side oriented with its apex in a northwesterly direction, facing southwest. An articulated right upper limb (humerus, radius and ulna) was found in the southern part of the burial pit (i.e. at some distance from Sk (20036)). The capitulum had formed and was recovered in anatomical position. Developmentally, this limb could belong to the mandible nearby and perhaps with the previously mentioned cranium Sk (20036) at the northern margin of the pit. These suggest an age at

death of about 6-8 years. The remains of an adult right foot Sk (20039), and especially the great toe of the foot, lay directly on top of the cranium of Sk (20034), a largely complete child of 6-8 years of age at death. A piece of obsidian lay nearby this foot. This foot likely belongs to the more southerly adult right hip of the two adult hips in the eastern part of the grave that remain to be excavated. These hips are so strongly flexed that the femur impinges on the attachment area for *M. rectus femoris*; this is not a physically natural degree of flexion. This child, Sk (20034), lay on its left side, oriented in a southwest-northeast direction, head to the southwest, facing northeast, with the head flexed onto the torso. The right upper limb was flexed at the elbow and medially rotated at the shoulder. The right forearm, wrist and hand were in a pronated position. The left upper limb was beneath the torso and lying on the floor of the grave, flexed at the elbow, with the forearm, wrist and hand in a supinated position. Both lower limbs were flexed at the hips and knees and adducted towards the midline of the body. Both feet were slightly dorsiflexed and both medially rotated. In essence, this was a fetal position. Remains of what appear to be an infant were exposed in the northern part of the pit, and these remains have yet to be excavated. At present, the remains of two additional adults represented by their right hips (one with the sacrum also appearing in lateral view), lower limbs and pedal extremities have been exposed in the northern part of the pit and clearly extend beyond the current excavation cut. They currently have no assigned skeletal numbers. The more eastern of these two presents the left foot uppermost, with the toes of this foot held in hyperextension and the forefoot elements in a strongly flexed position with respect to the

hindfoot (as seen in Chinese foot-binding, for example, though this is NOT an *in vivo* example of foot-binding). This appears to be a very unnatural position (i.e. beyond what would be physically possible without constraint of some type). The right foot lay immediately beneath the left and in contact with it, perhaps suggesting that they may have been bound together.

## Building 89

*F.3478, Sk (30900), Cut (19880), Fill (19877)*



Figure 6.13. Sk (30900) in burial F.3478.

F.3478 represents the primary burial of a relatively complete and well-preserved subadult. Based on the stage of dental development and eruption, Sk (30900) was estimated to be 3 +/- 1 years of age and assigned to the 'infant' age category. Sk (30900) was buried in a flexed position and lying on its left side (Fig. 6.13). This individual was oriented on an east-west axis with the head to the west and facing toward the northeast. Although the body was placed on its left side, the left tibia and fibula were lying on top of the right femur, indicating that the flexed lower limbs were crossed at the knee. The cranium and mandible of Sk (30900) were located

directly below a small cut once thought to be a retrieval pit, but which is now interpreted as the burial cut (19880) for this individual. This small, bell-shaped cut appears to be stratigraphically later than the burial cut (19896) for F.3481 as well as the largest cut (19891) associated with F.3479. Therefore, F.3478 is interpreted as the final burial within the northeast platform (F.3473) of B.89. The distance between F.3478 and F.3481, as well as the small size of both the cut (19880) and skeleton (30900), has precluded any disturbance to the burial feature (F.3481) of the child skeleton (19887) located farther south within the platform (and see below).

*F.3481, Sk (19887), Cut (19896), Fill (19897)*

F.3481 is the primary burial of a relatively complete and well-preserved subadult. Based on the state of epiphyseal fusion and the stage of dental development and eruption, Sk (19887) was estimated to be 6 +/- 2 years of age and assigned to the 'child' age category. Sk (19887) was buried in a flexed position and lying mostly supine, with slight rotation of the body onto its left side. The body was interred in an east-west orientation with the head to the west. The cranium and mandible were flexed so that Sk (19887) faces toward the east, although the cranium is rotated to the left so that the face is also in a slightly prone position. A band of phytolith was present along the right side of the cranial and facial elements (frontal and maxilla) and was sampled for further analysis (19887.s1). At the time of its excavation, F.3481 represented the only known primary (undisturbed) burial in the northeast platform (F.3473) of B.89 and was therefore thought to be the final burial within this platform. However, as excavation of the platform proceeded farther to the north it was determined



that F.3478 was stratigraphically later than F.3481; thus, although F.3481 was undisturbed by any other burial cuts, it does not represent the final interment within the northeast platform (and see above for further discussion).

## Building 96

*F.7003, Sk (20810), Cut (20811), Fill (20809)*



Figure 6.14. Burial F.7003 and skeleton (20810). Photography: Scott Haddow

F.7003 represents the primary burial of a relatively complete but poorly preserved probable male adult (Fig. 6.14). Age at death was estimated based on the completion of epiphyseal fusion and the eruption of the permanent third molar, but the poor preservation of the *ossa coxae* prevents a more specific age estimation than 'adult' (20+ years) at this time. Sex was recorded as probable male based on the characteristics of the cranium and mandible. Sk (20810) was very tightly flexed and lying on its left side with the head to the west and feet to the east. The cranium and mandible were also tightly flexed, and the face

was toward the northeast. This individual was very tightly fit into the burial cut (20811), and both the cranium and toes were strongly flexed against the sides of the cut.

*F.7008, Sk (20824), Cut (20825), Fill (20823)*

F.7008 is the primary burial of a partially complete and poorly preserved adult female. The top of the cranium was partly exposed in the 2012 field season. The rest of the skeleton was excavated and lifted this season. The burial infill was compact and was partly removed as fill unit (20818) because the boundary between this unit and the fill (20823) of F.7008 was not visible in the upper strata. Additionally, the southern portion of the actual burial was disturbed to some extent by burial F.7001, which was on top of it.

This was a Neolithic burial of a tightly flexed individual lying on its right side with head oriented west and feet oriented east (Fig. 6.15). The neck was flexed and rotated right, leaving the skull facing south and somewhat downward. Many small fragments of some kind of carbonized substance were found within the thoracic region, and the interior aspect of the right ribs had a dark, almost burnt appearance. A sample of the carbonized material was taken for further analysis. Both lower limbs were tightly flexed at the hip and knee, and dorsiflexed and medially rotated at the ankle. The positioning of the upper extremities was more complicated. The left shoulder was rotated medially,





Figure 6.15. Burial F.7008, with skeleton (20824). Photography: Scott Haddow

adducting the limb across the midline of the body. The left elbow was flexed at an acute angle, leaving the left forearm supinated and descending almost directly beneath the left arm. The left wrist and hand were also supinated and tightly flexed. The left hand appears to be cradling the right elbow. The right shoulder was medially rotated and slightly adducted, with the right arm passing under the rib cage toward the flexed legs at an oblique angle. The right elbow was slightly flexed (ca. 140°) and the forearm, wrist and hand were all supinated. The

right wrist and hand appear to have been extended so that the bones of the hand ultimately rested atop the individual's left *os coxae*. This individual's lower back seems to have been resting against an object comprised of phytolith-bearing material, possibly a reed mat. This might, however, belong instead to a burial located both physically and stratigraphically between F.7007 and F.7008.

Age was estimated based on the completion of epiphyseal fusion and the eruption of the permanent third molars, but the poor preservation of the *ossa coxae* did not allow for a more specific age estimation than 'adult' (20+ years) at this time. Sex was recorded as female based on the characteristics of the cranium and mandible. During cleaning and processing of Sk (20824) in the lab, it was noted that multiple healed, depressed fractures were present along the sagittal suture of the cranial vault. Therefore, this individual will be an interesting addition to the ongoing analysis of cranial trauma (see above) when this research continues during the 2014 field season.

Some loose subadult long bones were uncovered under the bones of this individual's right shoulder and upper thoracic region by the left hand. Initially, it was thought that this might represent an infant cradled in the arms of Sk (20824). After the rest of the infant skeleton failed to materialize, however, these bones were reinterpreted as disarticulated bones from the burial infill. Additionally, some loose plaster and a loose human incisor were found in the burial fill under the individual's abdominal area. Finally, below Sk (20824), bones from an adult were visible. These bones are presumed to belong to another primary interment which will likely be excavated in 2014.

#### *F.7010, Sk (20830), Cut (20828), Fill (20827)*

F.7010 represents the secondary deposition of an adult cranium (Fig. 6.16). The interpretation of a secondary deposition (rather than primary disturbed) was reached based on the stratigraphic sequence of cuts (i.e., 20835 is earlier than 20828) and the elements present (i.e., cranium only – no mandible, hyoid, or cervical vertebrae were in articulation). Although fragmentary, the cranium of Sk (20830) has retained a distinctive, rounded vault shape, as opposed to being flattened. This may indicate that the cranium was deposited relatively soon after death, while some soft tissue was still present to preserve the rounded shape (and see above for further discussion). Age was estimated

based on the eruption of the permanent third molars, and Sk (20830) was assigned to the 'adult' (20+ years) age category. Based on the sexually dimorphic characteristics of the cranium, the sex of this individual was recorded as probable female.

*F.7011, Sk (20832), Cut (20835), Fill (20836)*



Figure 6.16. Primary burial F.7011 with cranium (20830). Photography: Scott Haddow

F.7011 is the primary burial of a relatively complete but poorly preserved adult female. Age was estimated based on the auricular surface phase of the ilium, and Sk (20832) was assigned to the 'older adult' category. Sex was recorded as female based on the characteristics of the cranium, mandible, and *ossa coxae*. This individual was interred in a tightly flexed position and lying on its right side (see Fig. 6.16). The burial orientation was east-west, with the head to the west and the face toward the southeast. The cranium of Sk (20832) is almost in direct contact with the cranium of

Sk (20830), which represents a secondary deposition that was likely deliberately placed in association with this individual.

### TPC (Team Poznan Connection) Post-Chalcolithic burials

*F.3974, Sk (30215), Cut (20296), Fill (20295)*



Figure 6.17. Islamic burial F.3974, skeleton (30215). Photography: Scott Haddow

F.3974 represents the primary undisturbed burial of a middle adult female. Age was estimated based on the degenerative changes of the pubic symphysis and auricular surface of the ilium, respectively. The body was placed on its right side in an extended position, with the head to the west and the feet to the east (Fig. 6.17). The head was extended and rotated to the right so that the skull faced south. The left hand was located above the lower

abdomen and the right upper limb was abducted from the body and the hand pronated on the floor of the grave cut. The left lower limb was extended and the foot plantarflexed. The right hip was

abducted and the lower limb was flexed 90° at the knee. The right foot was dorsiflexed. Based on the orientation of the body this burial can confidently be assigned to the Islamic period.

Observed pathological lesions include *osteochondritis dissecans* on the glenoid fossae of both scapulae as well as the trochlear surfaces of both humeri, reactive bone formation on the inferior anterior surface of the sacrum and spondylolysis of the 4<sup>th</sup> and 5<sup>th</sup> lumbar vertebrae neural arches.

*F.3989, Sk (30233), Cut (not assigned), Fill (30236)*

F.3989 is a probable Islamic period burial extending into the east section of TPC Trench 2. Only the cranium was recovered during the 2013 excavation season. As only the cranium was recovered, the age of this individual could only be estimated as an adult. Without the diagnostic bones of the *ossa coxae*, the sex of this individual could not be accurately determined. No cut number was assigned to this feature.

*F.3994, Sk (30251), Cut (30249), Fill (30250)*

F.3994 is a Post-Chalcolithic adult primary disturbed burial extending into the west section of TPC Trench 2. The upper body of Sk (30251), from the level of the second lumbar vertebra, remains in the western trench wall. The body is oriented in an extended supine position with the head to the west and the feet to the east. The right hand is extended and pronated beside the right *os coxae* and the left hand is extended and pronated above the lower abdomen. The right foot is plantarflexed and rotated laterally. The left foot has been truncated by a large circular pit. Based on the morphology of the *ossa coxae*, this individual appears to be a female. Given the extended supine orientation of this skeleton, the burial might belong to the Roman/Byzantine period, but without knowing the orientation of the skull we cannot be certain. If the skull is rotated to the right (facing south) it could also belong to the early Islamic period.

*F.7179, Sk (30775), Cut (30777), Fill (30776)*



Figure 6.18. Burial F.7179

F.7179 represents the primary burial of a Post-Chalcolithic adult male. Age was estimated in this case based on the eruption of the permanent third molars, but a more specific categorization could not be made at this time due to the absence of the *ossa coxae*. Thus, this individual was assigned to the broad category of 'adult' (i.e., 20+ years of age). Analysis of the sexually dimorphic characteristics of the cranium and mandible led to the conclusion that this individual was male. This individual was buried in an extended position and lying supine. The burial orientation was east-west with the head to the west (Fig. 6.18). The cranium and mandible were rotated to the right such that this individual was facing

southeast. Given the extended supine position, it is likely that this burial dates to the Roman/Byzantine period. However, the face was oriented toward the southeast, so the possibility

that this is an early Islamic burial cannot be discounted, as early Islamic burials may represent a transitional period characterized by supine burial rather than placement of the body onto the right side. F.7179 extended into the easternmost wall of Trench 3 such that all skeletal elements inferior to the distal humerus remain *in situ*.

### ***Space 1010***

#### ***F.7450, Sk (30414), Cut (30416), Fill (30415)***

F.7450 is the primary interment of a Post-Chalcolithic subadult truncated by the Mellaart excavations of the 1960s. This 1960s disturbance, along with animal burrowing, has resulted in the displacement and fragmentation of many of the skeletal elements, especially those of the feet, ankles, and lower limbs. Despite these disturbances, the bones remain in fairly good condition. F.7450 extends into the walls, F.7471 and F.7472, of what is believed to be B.II.5 as presented on Mellaart's plan of Level II, and elements recovered mainly derive from the lower limbs. Sk (30414) was buried in an extended position and lying supine. The burial is oriented on an east-west axis with the head to the west. Based on these characteristics, it is likely that this burial dates to the Roman/Byzantine period. Age was estimated based on the state of epiphyseal fusion, which suggests this individual to be roughly 12-16 years old at death, and therefore, an early 'adolescent.'

#### ***F.7480, Sk (30423), Cut (not assigned), Fill (30425)***

F.7480 is a Post-Chalcolithic burial identified late in the 2013 excavation season. The burial was heavily disturbed by the Mellaart excavations of the 1960s and more recently by animal burrowing; as a result the skull, much of the thoracic region, and the left upper limb are no longer present. This burial was covered with geotextile and will require attention early in the 2014 season. No cut number has yet been assigned to this feature.



## 7. East Mound Faunal Remains, 2013

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### Introduction

The aims of the continuing tranche of excavations and study seasons continue to focus on obtaining a comprehensive series of radiocarbon dates and providing secure chronological contexts for the Hodder levels; linking the South and TP excavated areas together via the Team Poznan Connection excavation (TPC); and extending the spatial and chronological extent of the site. This is being achieved by further exploring the earliest activity on the East Mound in the South area and by extending excavations in the North.

This year there are changes in the composition of the Çatalhöyük faunal team report with David Orton, responsible for the West Mound faunal remains, now reporting in the West Mound section of the archive report.

The review of the research aims and objectives of the faunal analysis continued with extensive discussion and debate both within the faunal team and across the wider project team that helped in the development of new research agendas and strategies.

One direct result of our 2012 review of the research potential of material from earlier excavation campaigns resulted in a British Academy Small Grant award for a collaborative project with the Human Remains team to assess the potential of unrecorded osteological material from the Konya Basin Palaeoenvironment project (KOPAL). This project, 'All Mixed Up,' aims to investigate the intertwined nature of human-animal relations in the earliest phases of Catalhöyük, as expressed in the unique set of co-mingled remains found lying external to the main settlement. Usually human and animal remains are disposed of separately, with the former being subject to formal burial on site. As a result, the location, early date, and relationship between the human and faunal composition of the KOPAL deposit are all of interest. As a result a project to fully record all the KOPAL osteological material using one single recording mechanism to allow for full comparability between humans and animals was adopted, with a greater focus on taphonomic changes. (The new KOPAL faunal data were not recorded directly into the centralized online database; they will be added into it in future.)

A second project, funded by Cardiff University, targeted units for a pilot study of previously recorded material using multivariate statistics to explore variation in dietary and depositional practice in midden units. This work focused on a small number of carefully targeted units from within and adjacent to the 'history houses' (56, 65 and 44).

A third project was undertaken in collaboration with James Taylor, who is researching the detailed temporality of Çatalhöyük, using intra-site GIS to model diachronic developments in their spatial contexts. Faunal data (primarily density data, thus far) are being integrated with other material

culture at the site in computerized visualizations of building construction, use, modification, abandonment, and destruction. The faunal team is thus participating in the Taylor-led Çatalhöyük Temporal Working Group, which plans to present a synthesized building life history at an international conference in 2014. Faunal intern Hannah Bowden led the faunal push to acquire density data for all units associated with the chosen structure, weighing all remains from units containing redeposited or “noise” fauna, which were deemed insufficiently faunally informative for full analysis (e.g., ashy rakeouts from fires, construction material).

Additional projects included finalizing recording of the 199 caprine astragali discovered in 2012 in Space 494 of the TPC area (see 2012 Archive Report, Faunal Report; units 20255, 20276, 20277, 20278, 20279, 20280, and 20281), and composition of a grant application (submitted August, 2013) to study the timing and character of cattle domestication at the site. The latter project is part of a faunal team push to learn more about taxa other than caprines at the site, and ties in with a Project-wide interest in the myriad changes that occur across multiple data sets midway through the occupation sequence.

Finally, as 2013 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. The number and size of priority units created by on-going excavations resulted in a focus on this material to feedback to excavators and other analytical teams, only small quantities of other material from 2013 or from previous season was analysed.

In summary the aims for 2013 were

1. to provide feedback on site priority units
2. to initiate recording of newly generated excavated material from the East Mound
3. to continue to record material excavated in previous seasons
4. to provide samples for radiocarbon dating (see below; also Bayliss, this report)
5. to analyse the faunal (and human) osteological material from KOPAL.
6. to explore variation in dietary and depositional practice in midden units within and close to the history houses
7. to collect bone weight data for collaborative material culture density analyses

## **Results**

During the eight week season the faunal team recorded over 40,000 fragments of bone. This sum comprised full recording of around 5,000 (NISP), newly excavated specimens (400 Diagnostic Zones (DZ)) from the East Mound, in addition to extending and enhancing taphonomic indices for just under 23,000 fragments from the history houses. A further 20,195 faunal fragments from KOPAL were also fully recorded.

Newly excavated material derived from the North, South and TPC areas of the site. The majority of material derived from the South area, with only slightly smaller quantities from TPC and significantly less from the North area. Sampling RC dating was also undertaken for TPC.

## Overview by Area and Phase

The distribution of recorded material (both NISP and DZ) by area (where available) is shown in Tables 7.1 and 7.2. Within the East Mound the South area producing around 55%, TPC 45% and the North less than 1%. The KOPAL project produced an additional 20.195 fragment of bone.

Mound	Area	NISP	DZ
East	South	2604	151.7
East	North	14	3
East	TPC	2134	177.6
Kopal		20195	n/a
<b>Total</b>		<b>24947</b>	<b>332.3</b>

Table 7.1. Distribution of faunal material by area

Of the material assigned to a Hodder Phase, on the East Mound 72% overall derived from South.O, 17% from South.M with 4% assigned to South.G and South.P (Table 7.2). All other levels contributed less than 1% each. Material with the TPC excavation 2013 is as yet unassigned.

Area	Level	NISP	DZ
South	H	7	2
	L	9	8.5
	M	301	5
	N	74	3
	O	1279	52.2
	P	74	37
	Q	6	3
	R		
	T	11	5.5
	Unassigned	841	37
TPC	Unassigned	2134	210

Table 7.2. Distribution of faunal material by phase

## Species/Size abundance

Material within the assemblage was assigned to 42 different identification classes. Overall the recorded assemblage was dominated by caprines (Sheep and Goat and Sheep-sized) for both the NISP and DZ quantification with a substantial proportion of bovine species (and Cattle-size) (table 3). Other notable classes of material include canids (dogs and foxes), in particular derived from a number of dog burials located within TPC and cervids (deer). A few bones of equids (horses), suids (pigs), bear, medium felids, hare and hedgehog were also noted, as well as snake, turtle and frog. All species have been previously recorded, although bear remains are extremely rare, with only two other examples encountered during previous seasons of excavation.

<b>Taxon</b>	<b>NISP</b>	<b>DZ</b>
Ovis	182	87.2
Capra	12	8.7
Ovis/Capra	437	97.0
Ovis/Capra/Capreolus	1	
Sheep-size	1014	16.0
Bos taurus	5	3.0
Bos primigenius	7	3.0
Bos sp.	104	38.5
Cow-size	410	1.5
Aurochs/bison-size	4	1.5
Large bovid	1	0.5
Equus sp.	6	0.0
Large equid	1	1.0
Small-medium equid	7	1.0
Sus scrofa	9	5.0
Cervus elaphus	73	0.5
Large cervid	5	1.0
Canis sp.	261	61.4
Vulpes sp.	2	
Vulpes vulpes	1	2.0
Small canid	1	
Medium carnivore	1	
Medium felid	1	
Ursus	1	0.0
Erinaceus europaeus	2	1.0
Lepus	6	
Hare-size	4	
Rodent	2	
Medium dog to wild boar	4	1.5
Medium sheep to medium cattle	1	1.0
Microfauna	3	
Small bird	1	
Medium bird	2	
Large bird	4	
Bird	27	
Reptile	3	
Snake	1	
Turtle	1	
Amphibian	3	
Frog	1	
Fish	6	
Indeterminate	2135	
	<b>4752</b>	<b>332.3</b>

Table 7.3. NISP for each identification category



The 2013 database contains a total of 232 measurement records and 179 dental records (both upper and lower teeth; 47 specimens have Payne and/or Grant dental wear data). The majority of these data derive from caprids, and the evidence available to examine changes in bovine 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.

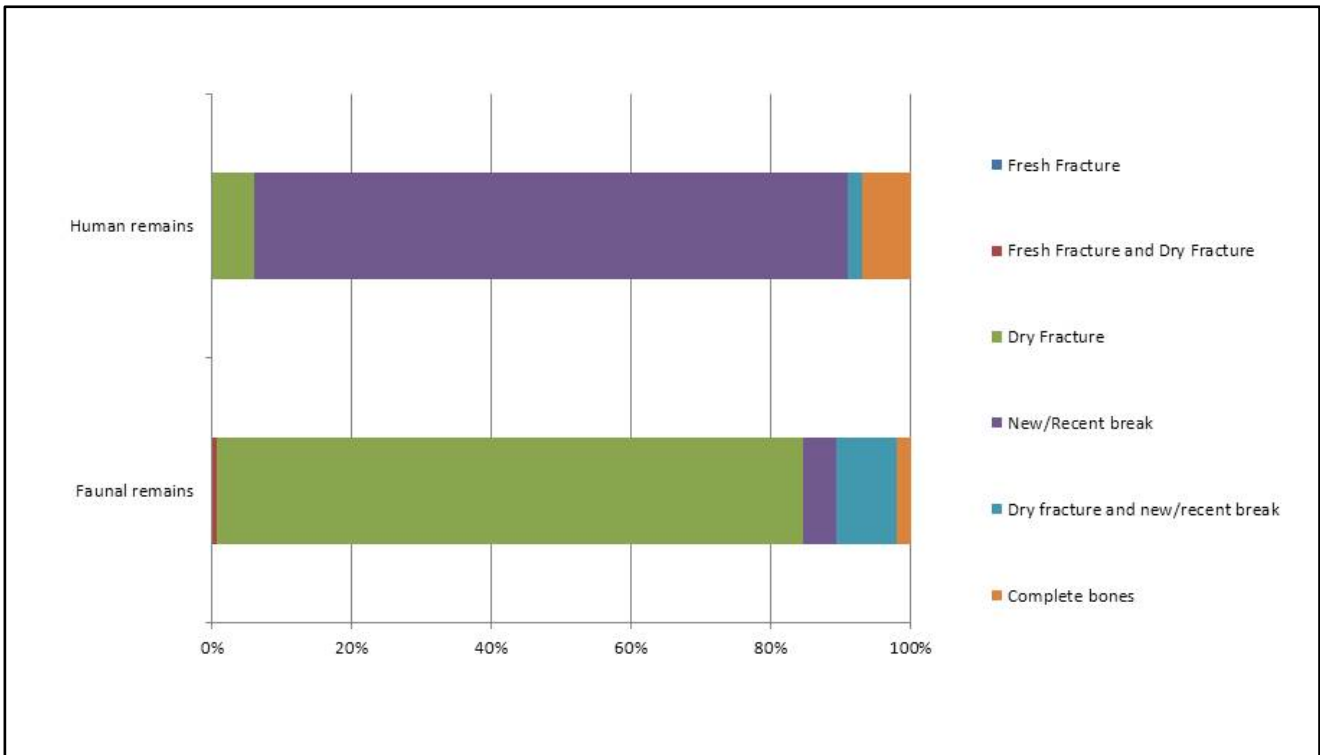


Figure 7.1. Proportion of major species NISP in all phases. Levels H,J, L and N have NISPs under 300. Only securely assigned chronological data are included.

Detailed reports on the East Mound South and TPC Areas follow. (Only fourteen specimens were recorded from the North Area.)

### South Area

The largest assemblage was recorded from the South. A total of 147 units were recorded. These derived from 43 spaces within which were seventeen individual buildings. As noted above, the majority of the assemblage, both in this area and overall, came from South. O (table 2).

Results from the South area in 2013 have been incorporated with those from previous years to compare the relative abundance of main species groups i.e. caprine, bovine, equid, cervid, and suid (domestic and wild bovines and caprines). The predominance of caprines throughout the history of the site continues to be clearly seen in figure 1. There are a few phases where bovine proportions increase, in particular South.O where bovines are nearly as common as caprines. However, the South.O bovine NISP (n=1741) are inflated by the presence of heavily fragmented horn cores in Units 18576 and 18561(425 horn core splinters in Unit 18576, 245 fragments in Unit 18561). If one counts each collection of splinters as a single specimen, the bovine proportions in South.O, while

still relatively high, do not stand out as dramatically. TAs noted in the 2012 faunal report, the other two levels with relatively high proportions levels of cattle have small sample sizes (H and J).

The majority of material assigned to the South area derives from spaces 370 (Building 96), 470 and 475 (Table 7.4).

Building/Level	H	L	M	M, L	N	O	P	Q	T	UA	Total
South	7	9	301	2	74	1279	74	6	11	841	2604
43		2									2
68								6			6
75							2				2
80						13					13
89					74						74
96						1013					1013
97						44				2	46
104			1								1
118	7										7
370							5				5
76, 80						209					209
UA		7	300	2			67		11	839	1226
<b>Total</b>	<b>7</b>	<b>9</b>	<b>301</b>	<b>2</b>	<b>74</b>	<b>1279</b>	<b>74</b>	<b>6</b>	<b>11</b>	<b>1662</b>	<b>2604</b>

Table 7.4. NISP for Buildings by Hodder Phase. UA is material as yet unassigned to a Level.

### TPC

Analysis continued on the assemblages from the infill deposits and the cluster of animal bones (20255; 20255.X38; 20255.X43; .X44; .X46; .X47) found between the walls of Buildings 110 and 111 in the 2012 season. In total, the number of animal bones from this context has increased to 601. Most of the results from this deposit have been presented in the 2012 archive report. The identification of the distal end of the femur (as derived from a calf) was verified. Astragali with modified surfaces were divided in 4 groups, according to the degree of wear and the side of modification.

In the 2013 season, dog skeletons (30260) (30259), bones in the sequence of Space 486 of Building 110, and evaluated deer antlers (30779.X1) were developed from the TPC Area. Samples for radiocarbon dating were selected and priority units were assessed (30293) (30705) (30716), and the rest of the material from the TPC Area as was briefly scanned.

### Space 508, post-Neolithic dog burial

A dog skeleton (30260) was found in the N part of trench 2. The almost complete skeleton was lying on its right side in an anatomical position indicating intentional burial. The cranium, mandibles, atlas, three cervical vertebrae, three lumbar vertebrae, sacrum, left scapula, femurs, patellae, two metatarsals, three first phalanges, and four third phalanges were not found. Axis, pelvis, and caudal vertebra were recovered in (30259). Considering the epiphyseal fusion, the skeleton comes from an adult. In the absence of maxillae and mandibles, more precise determination of the age is not possible. The bones have good surface condition, being light brown in colour with the presence of salt concretions on the surface, and the slightly shiny surface. No cut marks were found, a fracture with dislocation is visible on the left humerus, and osteomyelitis is present on the ribs, phalanx, left

radius, and ulna. In addition, a few thoracic and lumbar vertebrae have pathological lesions. Skeletal elements were generally found in anatomical order. The particular displacement of some elements (the phalanges, metacarpals, and metatarsals), and the post-depositional fracture of the humerus in the middle of the shaft (with one shiny edge, though not due to a modification) suggest that the skeleton underwent slight post-depositional movement.

### **Building 110**

Three units (30216) (30221) (30241) were recorded in the sequence of Space 486, Building 110. One of the first units in the sequence (at the top) was (30216). This unit could potentially be subject to contamination by later material. The relative proportions of sheep/goat and of cattle in it are not similar (caprine a little more frequent), and these predominate over other taxa (namely fox, cervid, and homo). The condition of the material is striking in terms of surface condition (good) and fragmentation (in case of sheep/goat, mostly cylinders, with no signs of biting at the ends, and with one end and shaft). Such preserved long bones suggest that processing involved bone marrow extraction but excluded the bone grease extraction stage. The presence of the heads and feet of caprines demonstrates that the early stages of butchery occurred. Skull elements, including the maxillae, are underrepresented, as matching with jaws indicates. This leads to a higher MNI (minimum number of individuals) than does counting postcranial elements. Such a low degree of processing of animal bones is remarkable for the Neolithic in Çatalhöyük, and is more reminiscent of the post-Neolithic. In addition, cattle astragali with modification of the dorsal surface may strengthen this, as so far only one such astragalus (North Area, Building 58, Space 227, 10205.F158) has been described from the Neolithic context. Conversely, were the context to be the Neolithic, this would be unusual. Measurements of cattle astragali using the log ratio (LSI) method fall in the domestic range. The cut marks on the one of the astragali would be unusual if considered as butchery marks, as they are not midway along the bone but on the distal articular surface. This unit has provided a flute/whistle, among other worked ones. It is made of a caprine femur with two holes and evidence of butchery marks.

The unit also contains an astonishing quantity of human bones with good surface condition, grey in colour, and with slightly shiny surfaces. Their state of preservation is comparable to that of bones from KOPAL. On the other hand, these bones do not have the orange-dark brown patina observed at KOPAL.

Aside from the issue of dating, the assemblage is homogeneous. Articulated pieces, the presence of delicate items like costal cartilage and hyoids, and the presence of juvenile elements indicate a lack of post-depositional disturbances. The assemblage was covered fairly quickly (as shown by the good surface condition of the elements) but was also exposed for at least some time (as seen from the few gnawing marks and the low percentage of digested).

Although the unit's taxonomic and anatomical distribution is consistent with a midden, it has much more integrity. The characteristics of the unit are so consistent that it looks to have come from a single event. Hence, it seems to be fresh post-consumption in origin, with also some primary butchery parts.

The unit below (30221) is comparable to (30216), but additionally contains pig remains (MNI = 2) and an avian long bone—presumably a femur with pathology in the joint. The minimum number of individuals is 10 sheep/goats (left mandibles) and 2 cattle (left humeri). Sheep/ goat vertebrae were found in articulation, as were cattle carpals. The next in the infill sequence in Space 486 is (30241), which is similar to (30216) and (30221). Among the human bones, a calcaneus has red staining in root etchings.

### **Space 514**

In an infill layer of Space 514 in Building 121, a deer antler was found (30779.X1). This has not yet been completely recorded, but several characteristics were already visible during exploration. The presence of first, second, and middle tines, as well as of at least two terminal points, allows us to specify that the antler represents developmental stage 10 or 12 points of the cervid antler, and that it comes from an adult male. The antler base is not preserved, so it is not possible to determine whether it has been shed and collected or comes from hunted individual. It is noteworthy that this find is one of the best-preserved antlers in Çatalhöyük. Another example of deer antlers from previous years comes from, e.g., Building 77.

In addition, six sets of articulated bones from different contexts were prepared for radiocarbon dating. During their selection, several units (20154) (20155) (20232) (20285) (20293) (30205) (30211) (30232) (30245) (30259) (30269) (30715) were scanned to qualitatively and quantitatively evaluate the material for their research value. From the taphonomic point of view, considering the homogeneity of the material, (30205), (30245), and (30259) worth further study. In turn, (30715) in Space 508—which includes parts of a skeleton from a disturbed burial of a dog together with a cow-size scapula—will be able to, once fully recorded, provide measurement data for this taxa, regardless of the fact that it has post-Neolithic dating.

Additionally, some field measurements of X-finds were made in different spaces of the North Area. These include a cattle mandible (30567.X3; Space 18, Building 102); sheep horn cores incorporated into a bench (.X1-6; no unit number as not yet excavated in this season, but just exposed; Space 94, Building 52); cattle horn cores (20965.X24 and 20965.X25; Space 511); a cattle scapula (20988.X11; Space 511); a cattle tibia and humerus, representing the most likely foundation deposits, which have not been excavated or lifted this season; and horse scapula, cattle horn cores, and cattle pelvis (Space 512, Building 119). Those that have been consolidated and lifted from the ground are fully recorded.



Area	Year	Building	Space	Unit number	GID	Element	Taxon
TPC	2012	110	486	20232	20232.F1	sacrum	Ovis/Capra
	2013	110	486	30216	30216.F2	lumbar vertebra	sheep-size
					30216.F3	lumbar vertebra	sheep-size
					30216.F4	lumbar vertebra	sheep-size
					30216.F5	sacrum	sheep-size
	2013	110	486	30245	30245.F1	metacarpal III+IV	Ovis
	2013	110	486	30269	30269.F1	lumbar vertebra	sheep-size
					30269.F2	lumbar vertebra	sheep-size
	2013		508	30260	30260.F12	metacarpal I	Canis
					30260.F13	metacarpal II	Canis
					30260.F14	metacarpal III	Canis
					30260.F15	metacarpal IV	Canis
					30260.F16	metacarpal V	Canis
	2013	110	486	30716	30716.F1	axis	Ovis
					30716.F2	cervical vertebra	Ovis

Table 7.5. TPC area, samples selected for radiocarbon dating.

### KOPAL Analyses Done in 2013

The majority of human remains from Çatalhöyük are recovered from intramural formal burials with faunal material recovered from floors, middens and infill layers. The human burials comprise small groups of individuals selected for internment and this combined with the low numbers recovered suggests that few people were buried on the mound. In 1995 the Konya Basin Palaeoenvironments excavated a trench external to the mound with osteological material (c7000-6700cal BC) that postdates the initial midden deposits on the mound, but predates the first built structures and provides the only evidence for off-site burial (Boyer *et al.* 2007). The remains of several disarticulated adult human individuals were co-mingled with fragmented animal remains (Molleson *et al.* 2007). Initial assessment of the human remains indicated good preservation and a lack of complete individuals with many, but not all, parts of the body present. Some of the bones were noted to have 'dry fractures' indicative of a secondary deposit, these combined with the body part representation contrast with the generally complete primary burials encountered within structures on the mound. For animals initial analysis revealed an unusual predominance of wild species (cattle, deer & wild boar) with entire carcasses present (Russell and Martin 2005).

Comingled human & animal remains are not uncommon occurrences on archaeological sites, but their interpretation can be flawed. In most cases they are analysed separately by different researchers working independently leading to interpretations that reflect impressions upon discovery rather than deriving from detailed assessment & comparison of the mixed assemblages. Often such deposits are interpreted to have resulted from disturbance, to represent cannibalism (with animals & humans subject to butchery) or considered to be result of funerary rites. To distinguish among these possibilities researchers must define the processes that led to what appear to be superficially similar contexts. Interpretation depends on part representation, fragmentation analysis, bone breakage patterns & assessment of taphonomic effects (weathering, animal gnawing, burning, & root activity).

This project aims to gain an in-depth understanding of the formation of this deposit by supplementing and enhancing the standard osteoarchaeological analyses by drawing on recent

research on taphonomy, midden formation (Madgwick etc) and integrative methods of recording human & animal bone (Outram & Knusel 2004).

**Methodology**

Both human and faunal material was fully recorded using common analytical techniques (zonation & preservational) and the same recording methodology as is generally employed for faunal remains. This was enhanced via the use of the more detailed Outram & Knusel (2004) zonation method and the recording of additional taphonomic evidence. Human bone was recorded by the human osteology team (Knusel) with faunal material recorded by the faunal team (Jones). A sub-sample of material will be subject to supplementary taphonomic, histological & collagenic analysis after Madwick & Mulville (2011, 2012), Koon et al. (2010). Data from KOPAL will be compared to a subset of material from pre- & post-KOPAL contexts. Preliminary results on species abundance, body parts and taphonomic indicators are presented below.

<b>Species</b>	<b>NISP</b>	<b>Percentage of NISP</b>
Ovicaprids	797	21.3
Capra	22	0.6
Ovis	7	0.2
Bos sp.	598	16.0
Human	184	4.9
Canis familiaris	170	4.5
Sus	124	3.3
S-M Equid	63	1.7
Cervus elaphus	31	0.8
Vulpes sp.	3	0.1
Canis sp.	2	0.1
Large equid	2	0.1
Turtle	2	0.1
Microfauna	2	0.1
Bird	6	0.2
Amphibian	2	0.1
Hare sized	19	0.5
Small canid	8	0.2
Medium canid	7	0.2
Large canid	1	0.0
Medium carnivore	2	0.1
Small carnivore	1	0.0
Large mammal	400	10.7
Medium mammal	318	8.5
Indeterminate mammal	969	25.9

Table 7.6. Species NISP representation from KOPAL

## Results

The entire KOPAL assemblage was analysed with the result that a total of 20,195 bone fragments, both human and animal, (NISP) were examined. Of these 3,740 fragments, or 19%, were identifiable to species, species group or size class. Faunal specimens were present in 119 units in total and the largest number of specimens were found within 6010 (NISP 827), 2010 (NISP 244), 2412 (NISP 250). Human remains were present in 37 units, the largest number of identifiable specimens were present in unit 6025 (NISP 26). Other notable units containing elevated numbers of identifiable human specimens were 6028 (NISP 15), 6010 (NISP 13) and 6040 (NISP 13).

There was a usual concentration of Canid specimens within unit 6047 comprising predominantly of articulating distal limb bones, some of which are articulated. Further articulating Canid specimens (radius and ulna) were present in unit 6025. These examples represent the only articulating material within these KOPAL deposits, and potentially indicate burials or partial burials.

### Species Abundance

Ovi/caprids remains dominate the identifiable specimens NISP accounting for over 22% of the total identifiable specimens, Bos species (including aurochs) represent a further 16% with human and dog accounting for 5% (Table 7.6). Other fauna represented include Sus, Equid and Cervids present in smaller quantities

A minimum of 17 caprines, 14 bovines, 7 suids and 5 were present within the KOPAL deposits (Table 7.7).

Species	MNI
Ovicaprid	17
Bovine	14
Sus	7
Human	5
Cervid	3
Equid	4
Canis	4

Table 7.7. Kopal MNI values

### Element representation

Body part representation was explored for the major species present (ovicaprids, bovines, humans and suids) using the Minimum Number of Elements calculated from zone data.

Preliminary analysis of a restricted suite of body parts (head and limbs) reveals that most of these elements were present. Lower limb bones (e.g. metapodia and tarsals) are less commonly represented in both the human and the faunal specimens (Figure 7.2). The metapodia are larger, robust bones in Ovicaprids and Bos and their absence may indicate removal prior to deposition. The absence of the tarsals and the smaller metapodial elements in Sus and Homo, could result from post depositional disturbances, which can cause smaller bones to be lost, for example relocation of middens. This will be explored further by conducting detailed taphonomic comparisons of surface texture, weathering, fragment size and post depositional alterations both within units and between units. Histological analysis of faunal remains from exported samples will enable a greater understanding of depositional history of faunal remains.

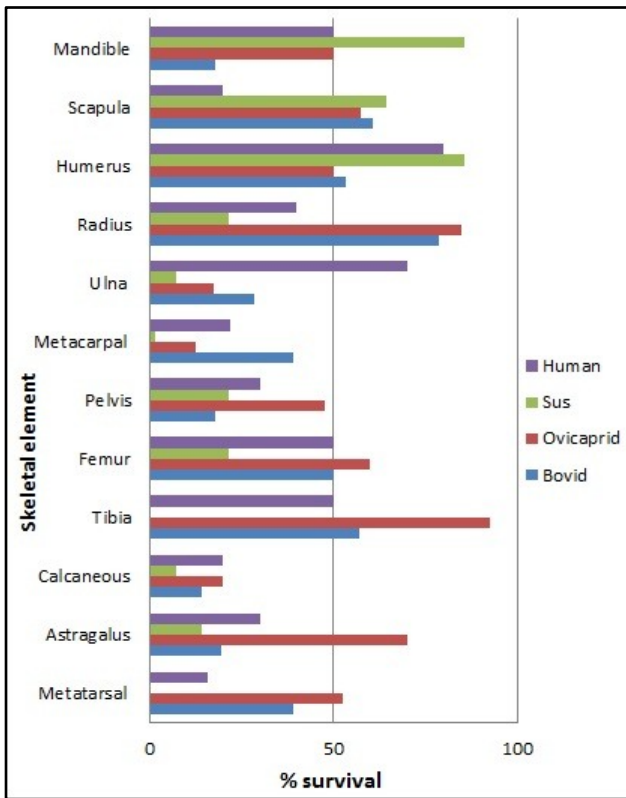


Figure 7.2. Element representation within KOPAL

observed on 26% of the human bone specimens and on only 7% of the identifiable fragments. This is indicative of differences in the treatment of human and faunal remains found within the KOPAL deposits.

% of bone fragments	Fauna	Humans
Unburnt	96.4	96.7
Calcined	0.8	2.6
Burnt	2.8	0.7

Table 7.8. Burning within the KOPAL human and animal bone remains

Analysis of bone fracture patterns using the Frature Freshness Index (FFI) (Outram 2001) also revealed differences between the human and animal remains. The FFI demonstrated that over 80% of the animal bones exhibited dry fractures (Figure 7.2) and suggests that faunal remains were broken after a period of time had elapsed since death, when bone collagen was no longer fresh. These results suggest that bone was not highly processed (e.g. for marrow cracking) and the breaks may be indicative of the re-deposition of dry bones, causing ancient fractures to be observed. There were fewer dry fractures observed in the human bone specimens. In addition there is a higher proportion of complete elements (figure 3) which may indicate that human remains were subjected to a lesser degree of post depositional interference.

Previous assessment of the faunal remains from the KOPAL area noted that cattle dominate the NISP (Russell and Martin 2005). The full analysis of the KOPAL material this year demonstrated that ovicaprid remains were the most numerous species present, with Bos being the next most commonly represented species. Previous analysis also highlighted the importance of wild species

The majority of bone within the human or faunal bone assemblages had not been subject to direct heat with only around 3% of material affected (Table 7.8). This is similar to the taphonomic signature of material from the East and West Mounds, where direct heating of bone is not a commonly observed phenomenon within faunal deposits. In the KOPAL assemblage human remains are more commonly subject to high temperatures (calcined) with faunal remains showing more evidence of low temperature burning.

No gnawing was observed on any of the human specimens and only 1% of the faunal specimens had been affected, by minimal carnivore and rodent gnawing. This lack of gnawing indicates that bones were subjected to relatively prompt disposal, preventing scavenging animals from accessing the carcasses. Root etching showed a very different pattern with highly contrasting values for human and animal bone, it was



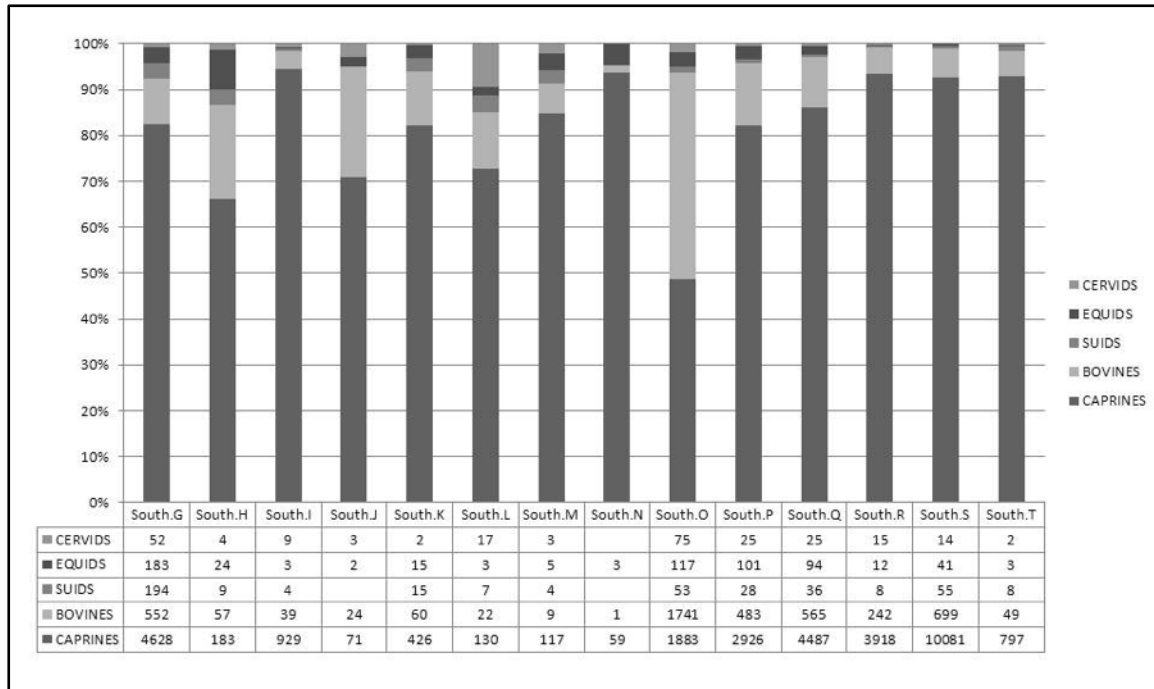


Figure 7.3. Fracture patterns within the KOPAL deposits

within the assemblage (e.g. Bos, Cervus, Equid, and Sus) (Russell and Martin 2005), this year the analysis confirmed that that wild species are numerous within the KOPAL faunal deposits, however fewer Cervus elaphus specimens were observed than previously noted, and were exceeded in number by Sus and Equid.

The scarcity of articulating remains in the material, combined with the mixed taphonomic history of the assemblage, and comingling of human and animal remains indicates that these deposits may not necessarily represent primary refuse deposits, but may instead be indicative of processes such as midden relocation, or building clearance. Further fragmentation analysis comparing NISP to MNI, fragment size, and taphonomic features within individual units and between units will allow this concept to be explored further.

Permission to extract 35 faunal specimens for histological analysis was granted, which will be invaluable in exploring the depositional history of the KOPAL faunal remains. Further analysis of the human and faunal datasets from the KOPAL deposits this year will aid with understanding the deposition and post depositional processes affecting the bone assemblage in this area to further explore human: animal relations in these early phases of the site.

### Pilot study on statistical approaches to midden unit variation

A new initiative for the 2013 season was the commencement of a focused pilot study exploring variation in dietary and depositional practice between midden units. The problem of establishing meaningful variation between units which can lead to interpretations of social practice has long been recognised. The relatively few in situ units have considerable potential to this end, but the vast

numbers of secondary deposits have proved far more problematic, often appearing to exhibit an 'averaged' signature, comprising mixed remains from a range of indistinguishable processes. This pilot study will attempt a new approach to establish variation between seemingly homogeneous deposits by incorporating additional taphonomic indices and using a multivariate statistical approach to analysis that is infrequently used for archaeological data.

Three new taphonomic variables were incorporated in analysis, as they have proved useful in establishing variation in depositional practice between homogeneous contexts at later prehistoric middens in Britain (Madgwick 2011). Firstly, the fracture freshness index (Outram 2001) is a method for recording fracture patterns and is useful for identifying the exploitation of marrow and grease (through fresher fractures) and the degree of post-depositional re-working that a unit has undergone (through dry fractures). Secondly, weathering was recorded following Behrensmeyer (1978) and is indicative of prolonged sub-aerial exposure, either prior to deposition or after disturbance. This has much greater potential for reconstructing taphonomic trajectories than non-specific indices of preservation. Thirdly, the Serjeantson (1996) zonation method of recording the element parts present and approximate percentage completeness was also employed. This method was instigated as part of the recording protocol alterations that commenced in 2012 and is therefore now employed in all recording. For expediency and analytical flexibility data was recorded into MS Excel, rather than using a modified version of the main database.

In order to maximise the chance of meaningfully differentiating deposits in terms of their composition and taphonomy, a small number of carefully targeted units were initially re-recorded for the study. Infill units from the 'history houses' (56, 65 and 44) and units immediately outside of them, potentially relating to the dwellings, were selected. Infill units from other houses that could be compared to exterior units, potentially associated with those houses, were also targeted to increase the sample size. Fourteen units were re-analysed in their entirety, but only eight of these comprised sufficient specimens for statistical analysis to be undertaken (1629, 1576, 1668, 1873, 11644, 16260, 17070, 17306). This was the case as FUD's sometimes indicated a large number of specimens were recorded, but this comprised a substantial proportion of fragments that are non-recordable following the 2012 changes in recording protocol. A total of 22,606 specimens were recorded for the pilot study, of which 2667 were identifiable and 589 were long bone splinters (for which all taphonomic data was recorded).

The next stage of the pilot study will be to undertake statistical analysis of the new dataset. Fuzzy clustering is the analytical approach to be applied, a method rarely employed for archaeological data (Baxter 2009). This builds upon attempts to characterise units through standard cluster analysis (Yeomans 2005). This research used a more limited suite of variables but on a far larger number of units and represents an impressive and novel approach to differentiation. However, as it established relatively little variation in most instances, a modified approach is required. The problem with cluster analysis is that it assigns all cases (in this case, units) to a cluster. In midden deposits, units may often be poorly suited to membership of any cluster but rather represent an amalgamation of processes and deposits and therefore fuzzy clustering represents a more fitting approach. Fuzzy clustering has the capacity to more clearly establish the strength of a case's membership to a particular cluster, by indicating the percentage probability that each case belongs to each cluster.

Initially Categorical Principal Components Analysis (CATPCA) is to be carried out to provide some indication of the appropriate number of clusters and to identify outlying cases. This is a relatively coarse tool, it does not explain all variation and is most useful for setting parameters for the next stage of analysis. All subsequent statistical analysis is to be carried out using R statistical software as neither Past nor IBM SPSS have the capacity to undertake fuzzy clustering. This is an exploratory technique that has, to our knowledge, not previously been used to analyse zooarchaeological data and therefore its success is not assured. The number of clusters, the number of variables, the combination of variables employed and other statistical parameters (M value, cluster function) will have to be experimentally tested in order to provide the most informative results. It might be expected that heavily mixed units would provide an averaged signature, indicating a high percentage probability for membership of several groups. A unit which has undergone little disturbance and may come close to representing a single event, would be expected to show a clearer pattern of membership of a single cluster. The variables which bring out these patterns will demonstrate the processes that formed the units. For example, if testing focuses on variables indicative of degradation and exposure, mixed units may show clear membership of a single cluster, as they are united by their degree of disturbance. However, if variables surrounding processing and element representation are employed in the model, the same units might show more disparate membership. As exceptionally few units are likely to represent a single event or process, it is hoped that fuzzy clustering can tease out more subtle variation in depositional and dietary practice that the more rigid standard cluster analysis could not.

This initial phase of the pilot study, testing only eight units, is very small due to the limited time that could be invested in fresh data collection. However, it is a proof of concept study and it was deemed necessary to re-record with a broader suite of variables in order to maximise the potential for the approach to be successful. This pilot study is crucial for establishing which variables are most informative and which are less useful for modelling variation. Once this has been established, the study can be extended to a broader range of units recorded on the main database. It may be that one or more of the newly recorded taphonomic variables are useful for discriminating units. This creates a problem in that the variable has not been recorded in the faunal database and consequently the approach cannot be employed in the same way for the main dataset. To overcome this, it will be necessary to run exploratory correlation analysis to establish whether other variables that are recorded in the main database show significant co-occurrence with the important variable. If a significant correlation is identified, the co-occurring variable can be substituted in fuzzy clustering on the main database. This is far from a perfect scenario but represents the best approach to incorporating a meaningful variable in analysis by proxy.

This study is in its early stages and it remains to be seen whether it will identify meaningful variation in practices that other modes of analysis have failed to do. It is a complex and convoluted approach and several of the parameters will need to be tested to optimise its function. If successful it could be employed beyond only faunal data and exploratory testing may be possible utilising wide-ranging datasets in a single analysis.

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## 8. West Mound Faunal and Worked Bone Report, 2013

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### Faunal Report

(Contribution by David Orton)

#### Overview

Limited time was available for faunal analysis on the West Mound – Trench 5 material during 2013, but analysis was aimed at filling some key gaps and at preparing the ground for intensive analysis during the 2015 and 2016 study seasons. In particular, much time was put into selecting radiocarbon samples and into extracting and registering worked bone specimens for study by Camille Piliouline, who we are very happy to have on board as our new bone tool specialist. Nonetheless, more than a thousand new specimens were entered into the database, 400 of them identified, with the number of recorded Diagnostic Zones (DZ) rising by 215.

Prior to the field season, considerable effort was also put into preparing the Çatalhöyük dataset – both the ongoing West Mound work and the 1995-2008 East Mound data – for online publication as part of a wider Anatolian data-pooling project. More details of this are given in the Faunal chapter of this archive report.

#### Taxonomic frequencies

Taxon	Upto 2012		2013	
	NISP	DZ	NISP	DZ
Cattle (mainly domestic)	103	40.5	24	13
Sheep/goat	1157	234.5	168	60.5
Sheep	1005	693	149	110.5
Goat	198	135.5	26	20
Pig (wild?)	8	0.5	2	0.5
Large equid	13	9	3	1
Small-medium equid	39	23	10	7
Large cervid	26		8	0
Red deer	21	4.5	6	0
Fallow deer	4		1	0
Roe deer			2	1
Dog (domestic)	24	8.000000015	1	0
Dog/wolf	3	2	0	0
Fox	2	2.200000003	1	0.199999997
Wildcat	1	1	0	0
Badger			1	0
Small mustelid			1	2
Small carnivore	2	1	0	0
Hare	1	0.200000003	0	0
Bird	33		3	
TOTAL	2640	1154.9	406	215.7

Table 8.1. The taxonomic distribution of specimens identified in 2013, by NISP and DZ, along with the figures for Trench 5 units studied in previous years.

## Contexts studied

Previous work on the West Mound – Trench 5 animal bones has concentrated on B.106, B.98, particularly spaces 340 and 449, and to some extent B.105. Work in the 2013 season focused on three different areas:

### *Space 343/463 (Building 107)*

Two fill units (16995, 16988) were studied from this area. These are immediately overlying arbitrary layers from the SW corner of the space and should probably be considered a single stratigraphic context, although there are some minor differences in terms of faunal composition and taphonomy. Both units are rich and very heterogeneous in terms of fragmentation and surface condition, suggesting a variety of taphonomic histories. They can perhaps best be characterised as 'midden', though overall condition is considerably better than in the classic East Mound middens. Both units include an appreciable fraction of very fresh material, marked out by *in situ* articulations and in the case of (16995) by the survival of several perinatal (i.e. unfused centrally) sheep-sized vertebrae. The most striking feature of the two units, however, is the evidence for bone working. The lower unit (16988) includes seven caprine scapulae which have all been worked in the same way, removing much of the blade but retaining the posterior edge and the glenoid process in order to make some kind of scraping tool. Of another seven more-or-less intact caprine scapulae in the overlying (16995) only one has been worked in this way, but the others should probably be seen in terms of bone working raw material, particularly given the caches previously noted from B.98. There is also a spatula formed on a cattle scapula blade (16988) and a utilised piece of pig scapula (16995). Other evidence for bone/horn working is concentrated in the lower unit: apart from some worked and utilised pieces of long bone there are several apparent antler blanks matching those noted from B.98 and a large number of horn cores in the unit. Unfortunately both the antler and the horn core suffered extensive excavation damage, but at least six of the latter were present based on tips and seem likely to be related to horn working given the other finds in the unit.

### *Space 341 (Building 98)*

The basalmost unit (16980) from this space was studied last year, and two immediately overlying fill layers were analysed in 2013 (16972, 16973). In terms of richness and taphonomy, these units fall somewhere between the very fresh deposits seen in Sp.449, 450 and the much more scrappy, reworked material from Sp.340. The upper of the two units (16972) is unremarkable in terms of composition: almost exclusively sheep and goat, with an even anatomical representation. While the underlying (16973) also has the typical West Mound dominance of sheep and goats (at >95%), it has a striking preponderance of foot bones, including 22 phalanges from at least five individuals based on species, age, and size. Carpals, tarsals, and metapodia are also well-represented, while other elements are quite scarce. Unit (16973) also features several cases of unfused epiphyses present *in situ*, indicating limited post-depositional disturbance, although there were – surprisingly – no unequivocal articulations between the various phalanges.

### *Space 449 (beneath floor of B.98)*

Towards the end of the 2012 season a small test sondage was dug through the floor of B.98 (16977) in the south part of Sp.449. The small amount of faunal material from this sondage was studied in 2013 with a view to identifying possible <sup>14</sup>C samples, but may nonetheless help to inform the

stratigraphy. Three units contained animal bones. Firstly, a cluster of clay balls (18369) immediately beneath floor (16977) contained just five small fragments that look like 'background noise'. Beneath this cluster was a second floor (18376) that actually lay immediately beneath (16977) in most of the building. The excavation of part of this floor in the 2012 sondage produced 11 bone fragments which, while fairly fragmentary, seem too large genuinely to be part of the floor and probably either represent remains immediately on the surface or – more likely – derive from the underlying fill. The excavated portion of this fill (18377) produced 33 specimens, again dominated by small, reworked-looking pieces, but with a few fresher-looking specimens including a human metatarsal and two cattle teeth.

### **Radiocarbon sampling**

The current radiocarbon project for Trenches 5 and 7 allowed for 15 samples, of which 13 were submitted following the 2012 season. Since two of these failed, and are thus charged at half price, the team currently has credit for three more samples in total. It was decided to target these at B.98, starting by exporting two samples of articulated bone from immediately on floor (16977), excavated during 2012 in units (16980, 16981). In order to bracket the construction of B.98, the team also sought a good sample from beneath the floor during its excavation towards the end of the 2013 season, and this was eventually found and exported in the form of a phalanx (with unfused epiphysis present *in situ*) from (31227) – a fill unit which lies beneath the make-up layer for B.98 and above the floor of the preceding building (31218).

In preparation for a planned extension of the dating project, 10 more articulated samples were exported from various key contexts in Trench 5, associated with earlier building phases than those dated so far and/or with buildings that have yet to be dated. In addition, a new set of seven samples was exported from the Trench 7 sequence – this time exclusively articulated bones.

### **Worked Bones**

(Contribution by Camille Piliougine)

This is a preliminary report on the West Mound Worked bones collection from Trench 5. During August 2013, I examined 310 worked bones from Trench 5, all found between 2009 and 2013 on the West Mound. They come from B.98, B.105, B.106 and B.107.

A portion of the bone artefacts was identified in the field, others were recognised during faunal analysis and some worked bones were extracted from previous seasons' faunal crates for the study. These required some laboratory time as they were not registered as worked bones and had never been studied before. This first study was meant to enable a better idea of the collection and of the possibilities it gives us in terms of technological, functional and social analysis.

Priority has been given this year to typological issues - as typology is the key to truly master an unknown archaeological collection and the first stage of any collection study.

Typological analysis of the worked bones has already been undertaken for the artefacts found in the North, South and KOPAL areas (Nerissa Russell, 2005 ; Janet Griffitts, 2011).

For this preliminary report I chose to present the main types, raw materials, morphology of the active part, and anatomical elements.

## Bone tools

### Pointed bone tools

This is by far the most common bone-tool type in Trench 5 of the West Mound (1/3 of the collection). This group includes any bone tool with a sharp point. In the Trench 5 assemblage we can find pointed bone tools on metapodia, ulnae, ribs, scapulae or on un-determined long bones. On metapodia, the bone is longitudinally split and pointed at the distal extremity. *Capra* or *Ovis* metapodia were used to create very thin points. One of these, 15180.x6, which was found in 2010, presents a carved head of an animal, possibly a goat (see Fig. 8.1).



Figure 8.1. Pointed bone tool with carved animal head, 15180.x6. Photography: Jason Quinlan.



Figure 8.2. Cylindrical sticks extracted from long bones and sharpened at both extremities: (left to right) 16981.x3, 16981.x4, 18351.x43, 16981.x5, 16992.f39. Photography: Camille Piliougine

For ulnae, the bone is sharpened at the distal extremity of the tool. Only three points on ulnae were found in the collection I examined this summer (eg 16997.x5; 15335.f59). The olecranon process of the bone is still present on these tools.

Out of the 310 worked bones, two were pointed tools from large ribs (possibly *Bos* or equids): 15340.f25 and 18328.f36. Here again, bone has been sharpened at one extremity.

On medium size ribs, we can distinguish between sharpened perforated tools and sharpened unperforated tools. In both cases, the rib is longitudinally split and pointed at one extremity. This type of tool is not so common in the examined collection (eight pieces so far). Of those, four are perforated tools: 15174.f34 31189.x17-34 16964.x1 18302.x4.



In addition, two scapulae fall into this category of tool. The epiphysis of the bone has been removed and the distal extremity pointed. Part of the subscapularis fossa has been removed and presents irregular edges.

Finally, eight cylindrical sharpened tubes can be noticed in the collection (see Fig. 8.2). They have been extracted from long bones (sheep size) and sharpened at both extremities (two active parts). As these sticks have been extracted from long bones apparently by double grooving, it's impossible to determine precisely the bone used or the taxon.

### Beveled bone tools



Figure 8.3. Beveled bone tools made on tibial: (left to right) 16966.f45, 16967.f3, 16850.x1, 16966.f151, 16988.f2, 17259.x20, 16995.f43.  
Photography: Camille Piliougine



Figure 8.4. Beveled bone tools made on scapulae: (left to right) 16966.f145, 15335.f56, 31199.x5. Photography: Camille Piliougine

Beveled bone tools are those with a bevelled active part. The bevel can be acute or obtuse, with a straight or a convex linear edge. It can be located at the extremities (eg: tibia) or on the sides of the bone (eg: scapula). The bevels examined here are unifacial.

Most of the beveled bone tools are made on *Ovis* and *Capra* tibia (about 2/3 of all beveled tools). Along with the points on metapodia, this is the most common type to be found on the West Mound- Trench 5. The tibiae have been bevelled at the distal extremity of the bone. In most cases, the bevel is quite large, with a straight or slightly convex linear edge. However artefact 16966.f45 presents a very tight bevel with a marked convex linear edge (see Fig 8.3).

Another group of beveled bone tools was made on *Ovis* and *Capra* scapulae. In this case, the scapula was beveled on the lateral edge of the bone. This edge presents a slightly concave shape and constitutes the active part of the tool.

Double-beveled tools are also to be noticed in the collection. These are all made on radii and present a unifacial quite large bevel at both extremities. The linear edges of the two bevels are dissymmetrical, with a global convex shape, more pronounced on one side (eg: 17265.F1).

### **Rounded edged bone tools**

This morphological aspect is to be seen on some large ribs and on two scapulae from the examined collection. On ribs, the edges of the bone's extremities have been rounded. No splitting is to be noticed on these ribs (eg:17288.F1). Next, the scapula 18356.f5 presents a rounded linear edge on one side. Finally, another scapula, one from a large mammal, has a rounded edged distal part and regular edge sides.

### **Antler tools**

Antler tools from West Mound- Trench 5 are less numerous than bone tools (about ¼ of the collection) but they are nevertheless as important to study. Bone material and antler do not share the same intrinsic properties and are consequently not used with the same purpose.

I distinguish here beveled tools, hollowed tools, tools with a convex surface active part and blunt pointed tools.

### **Beveled antler tools**

As for the beveled bone tools, this type includes any tool with a beveled active part. They are found on beam or tines. In the examined assemblage, only one beveled tool is so far to be observed on beam. 18356.x21 have been found in Unit 18356, with several other antler tools (see Fig. 8.5). The beam have been sectioned on both sides and beveled at its distal extremity. The bevel is large, with a marked convex linear edge.



Figure 8.5. Antler tools found in Unit 18356, B.105, sp 342 (left to right): 18356.X21: hollowed antler fork; 18356.X20: beveled beam; 18356.X41: tine with a convex surface active part.  
Photography: Camille Piliouguine

Beveled tools on tines introduce a new difficulty for classification: if they seem to be more numerous than bevels on beam, we have to be careful about it as the “bevel” located at the very end of the tine might be a natural break and not an anthropic one. Indeed, breaks at this location of the antler are quite common during the life time of the animal. Therefore, even if the tine has obviously been sectioned by humans on the other extremity of the worked antler, it could mean that we are dealing with a production waste and not necessarily a tool.

### **Hollowed antler tools**

Two kinds of antler tools fall in this category. The more common one (at least ten pieces) is made on a tine which has been sectioned at both sides and partly hollowed at one or both sides. One of the pieces, 15357.x9, bears a deep groove of 3cm of length on one side. Another, 15343.x23, is more tight on one side because of the natural morphology of the tine which has been

conserved. It also has a grooving line going around the tool near its largest side. The other tool which enters in this category is a single piece, 18356.X21 (see Fig 8.5). It is made on an antler fork.

The two tines have been removed by grooving and sawing. The fork has been hollowed starting from its larger side (extremity of the antler beam). In the inside of the tool, the archaeologists were surprised to find a deposit of material looking like mortar.

### **Antler tools with a convex surface active part**

A single tool falls into this category: 18356.x41 (see Fig. 8.5). It is a large red deer tine which has been sectioned at both extremities. The section of the narrowest extremity constitutes the active part of the tool and has a convex shape.

### **Blunt pointed antler tools**

In the collection we can find this kind of making on antler tines. The tine has been sectioned by grooving and sawing at its larger end whereas its other end presents a blunt pointed extremity. However, like for the beveled antler tools made on tine, we have to be careful about the reasons of the blunting. Indeed, it might be the result of natural wear of the tine. Therefore, “blunt pointed antler tools” might possibly be just waste.

### **Ornaments**

Ten pieces of the West Mound- Trench 5 collection observed this summer, can be classified as ornaments. As this study is not about function of worked bones but about typology, I will just briefly presents them according to their raw materials and morphology.

### **Bone Ornaments**



Figure 8.6. Part of the bone and dentine perforated ornaments: (left to right: 16967.f5 31206.x3 15355.x4 17288.x8). Photography: Camille Piliouguine.

Eight ornamental pieces are made of bone. Four of these have perforated elements, with one or two holes (see Fig. 8.6). One of the pieces, 17288.x8, has an engraved decoration of lines. Two other bone ornaments are carved in a shape of tooth. One other, 18334.s1, is carved in an oval form, with a large grooved line in the middle. The last one, 16850.x2, certainly one of the finest pieces from Trench 5, is carved in shape of a six-pointed star.

### **Dentine Ornament**

Two Ornaments are made on teeth of equids or *Ovis*. One of these presents four perforations (see 16967.f5, Fig. 8.6), the other is a fragmentary piece.

### **Preforms and Wastes**

The identification of unfinished tools and discarded pieces of bone and antler is an essential part of studying a worked bones collection. In the West Mound- Trench 5 assemblage, I identified preforms on tibiae (*Capra/Ovis*) and on metapodia (*Capra /Ovis*) and I also noticed waste from antler (tines and one fork).

Preforms on tibiae (two pieces so far) are characterized by the removal of a part of the tibial plateau which is beveled. Therefore, they are possibly preforms for beveled bone tools on tibiae (eg:15368.x6, 15368.x1).

Four preforms on *Ovis* metapodia present one or two long parallel grooves along both sides of the bone. In addition, the epiphyses have been removed (eg:16950.x2 16950.f51 16967.f2 16980.x17). On one *Capra* metapodial, 15160.f14, half of the epiphysis has also been removed and both sides of the bone have been smoothed.

### **Conclusion**

This preliminary study on 310 worked bones from West Mound- Trench 5 confirms the potential of this collection in term of technological, functional and social analysis. It shows us the variety of bone tools and ornaments in everyday life at Çatalhöyük during the Chalcolithic period. This variety is even more remarkable when one considers the taphonomic issues which go along with the study of worked bones and bones in general. This year, I intend to focus on technological issues of the collection and, next summer, I will consider its functional aspect through a traceological study.

## 9. Çatalhöyük Anthracology Archive Report 2013

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### Vegetation management and fuel use

Following on from last season's intensive laboratory work on expanding the existing anthracological sequence at Çatalhöyük, during the 2013 season the preliminary examinations of charcoal samples from newly excavated midden units in the TPC and North Areas were completed. Currently the analysis of new samples from the TPC, North and South areas is ongoing and results will be reported in detail in future publications. The ongoing analysis on wood diameter and curvature measurements in the Liverpool Archaeobotany Laboratory will be combined with qualitative analyses of growth ring morphology to assess changing strategies of woodland management at Çatalhöyük. In order to address some research questions regarding onsite fuel use and taphonomic processes a new recording system for calculating charcoal densities was put into place this summer involving the recording of number of fragments, plus total wood charcoal weight and volume for every sampled context. It is hoped that the implementation of such indices on a wide scale across the site will assist in addressing wood charcoal discard practices in a range of contexts, especially with regard to indoor vs. outdoor practice areas.

Two midden units (30773 and 30774) from the TPC area were examined during the field season. Both units contained a diverse range of taxa including juniper (*Juniperus*), almond (*Amygdalus*), willow/poplar (Salicaceae), elm/hackberry (Ulmaceae), deciduous oak (*Quercus*) and terebinth (*Pistacia*) and were similar in composition to previously analysed TP midden samples (Asouti in press). A number of building infill units from the TPC area provided an interesting opportunity for comparison between midden and infill contexts with regard to taxonomic diversity and preservation conditions. The anthracological assemblage of the infill units (30757, 30737, 30292, 30298, 30264, 30705) was dominated in most cases by juniper alongside oak charcoal. Diversity was lower in the building infill units compared to the middens. A bin fill (30247) excavated in the TPC area also contained high proportions of juniper, with many of the fragments belonging to larger size stems. They were flattened along the tangential plane and a high incidence of boreholes, and might therefore represent structural wood. A midden unit in the North area yielded an interesting mix of twigs plus debris from woodworking including several diagnostic fragments (20965, Space 511). This sample has been exported to Liverpool for further detailed analysis.

Wood charcoals from priority units from all areas of excavation were also examined during the 2013 field season. 14 hearth/fire features were fully studied. Two fire features in the South area contained poorly preserved fragments of deciduous oak (*Quercus*) wood in Buildings 80 and 89 (units 20032 and 19883 respectively). While other fire features in Space 510 in the South area contained mostly elm (*Ulmus*) and hackberry (*Celtis*) wood (units 30601, 30632, 30629). Two fire features examined from the TPC area contained mostly elm and deciduous oak wood (units 30836 and 30842).



## Worked wood and timber

A number of hand-collected *in situ* carbonised worked wood fragments were also analysed during the 2013 field season. Perhaps one of the most interesting charcoal finds of the season was the wooden object in Feature 7127, a subfloor burial in Building 52 in the North area. A “boat-shaped” carbonized wooden object (see report on the excavation of F 7127, this volume) was preserved resting against the cranium of the adult buried in this feature. This burial feature of one adult and 4 infants yielded an array of organic remains, preserved most likely through exposure to indirect heat. The wooden object was thin (ca. 2 cm in thickness) and was identified in the field as cf. *Acer* (maple) with the aid of a dark-field/bright-field metallurgical microscope routinely used for all charcoal identifications on site. As a result of the burial conditions the charcoal fragments showed signs of mineralisation in their vessels and some tangential compression. Maple wood is rather rare in previously examined samples at Çatalhöyük. It has been identified in samples from the North G, South L, South M and South S phases (Asouti 2005, in press; Kabukcu in progress) The object was manufactured by splitting the trunk along the tangential longitudinal plane by following the grain of the wood. A maximum of 3 growth rings were visible on the examined charcoal specimens. Their thickness was more or less uniform (~ 1 cm) with slight tapering towards the edges. The use of maple in artefact manufacture suggests that this rare taxon could have been brought to the site for woodworking purposes.

Finally an *in situ* timber from Building 80 of the South area was examined and assessed for conservation. This halved oak timber was derived from a stem with a minimum diameter of 25 cm. Specimens from this piece have been exported to Liverpool for further analysis and more precise measurements.

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## 10. The Archaeobotany Report, West Mound

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University of Oxford

As part of a larger DPhil study based at Oxford, this report provides an overview of 149 archaeobotanical samples from Trench 5. This assemblage comprises samples from all excavation seasons (2006 -2013) by the current West Mound team. This report adds to and includes data from previous reports (Bogaard and Charles 2010; Bogaard et al. 2012). In addition to level 1 assessment (see Bogaard et al. 2005) of 149 samples, 27 samples were also comprehensively analysed.

The sampling and recovery strategy followed that of the East Mound (Hastorf 2005): 30 litres or more of sediment were taken from every excavation unit and processed using a flotation machine. The light fraction (flot) was collected in a c. 300-micron mesh, while the heavy fraction was collected in a c. 1mm mesh.

The flot samples were assessed following the site's archaeobotanical procedure for level 1 assessment (Bogaard et al. 2005). The flots were sieved into 4mm, 1mm, and 0.3mm fractions, and the volume of 1mm fraction was measured. If the 1mm fraction was greater than 10ml, a random subsample was taken using a riffle box to produce a subsample of 5-10ml in volume. The 1mm material was then sorted, and absolute counts were recorded using the following categories: grain and chaff components (glume bases or rachis internodes) of barley, glume wheat and free-threshing wheat; culm nodes, pulse seeds (bitter vetch, lentil, pulse indeterminate), sedge (Cyperaceae) seeds and other wild/weed seeds. Mineralised seeds of *Celtis* were counted separately, as were fragments of nutshell or fruitstone.

Data from previously assessed samples (2006 to 2010) are included in this report in addition to all samples from 2011 and 2012. Three quarters of the samples excavated in 2013 are also included (38 samples excavated at the end of this season will be assessed in the coming months).

The 149 samples were obtained through the flotation of a total of 3142 litres of sediment. A total of 1604 litres of sediment was floated in 2013 from Trench 5, comprising of 114 samples. Some of these samples (e.g. from gridded excavation of floors) were merged for the purposes of preliminary assessment.

### Results of preliminary scans

Figures 10.1-4 summarise the results of the preliminary assessment of 149 samples. Glume bases, glume wheat grains, barley grains and Cyperaceae seeds (sedges) occur in high numbers in most samples, while items such as pulse and free-threshing wheat grains are limited in their presence and abundance.

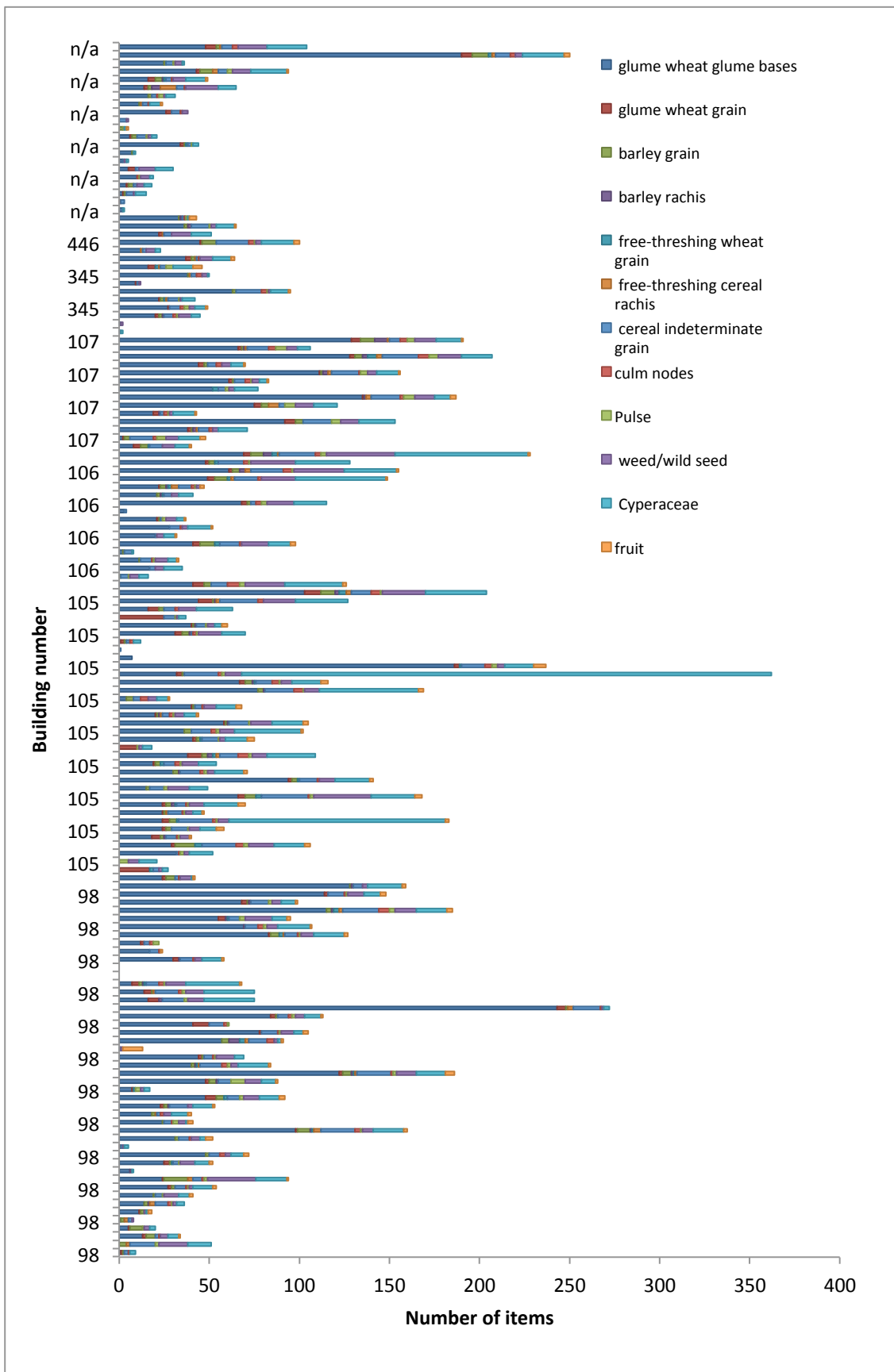


Figure 10.1. Bar chart summarising the composition of the 149 samples examined: Absolute counts. (N/A denotes samples which are not directly related to a building or space, F denotes fill and B denotes building material e.g. mudbrick or plaster).

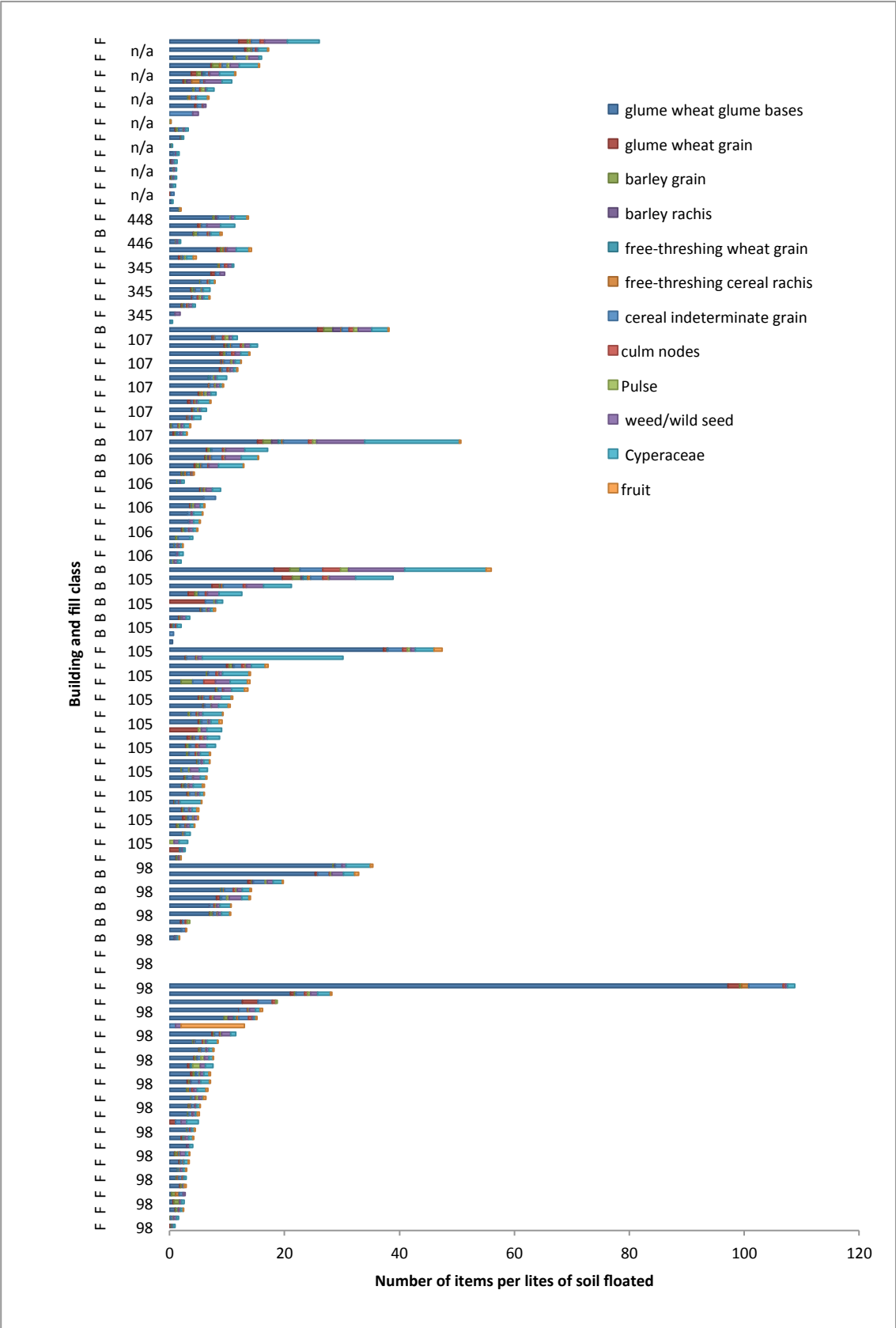


Figure 10.2. Bar chart summarising the composition of the 149 samples examined: Absolute count densities of items per litre sediment processed s. (N/A denotes samples which are not directly related to a building or space, F denotes fill and B denotes building material e.g. mudbrick or plaster).

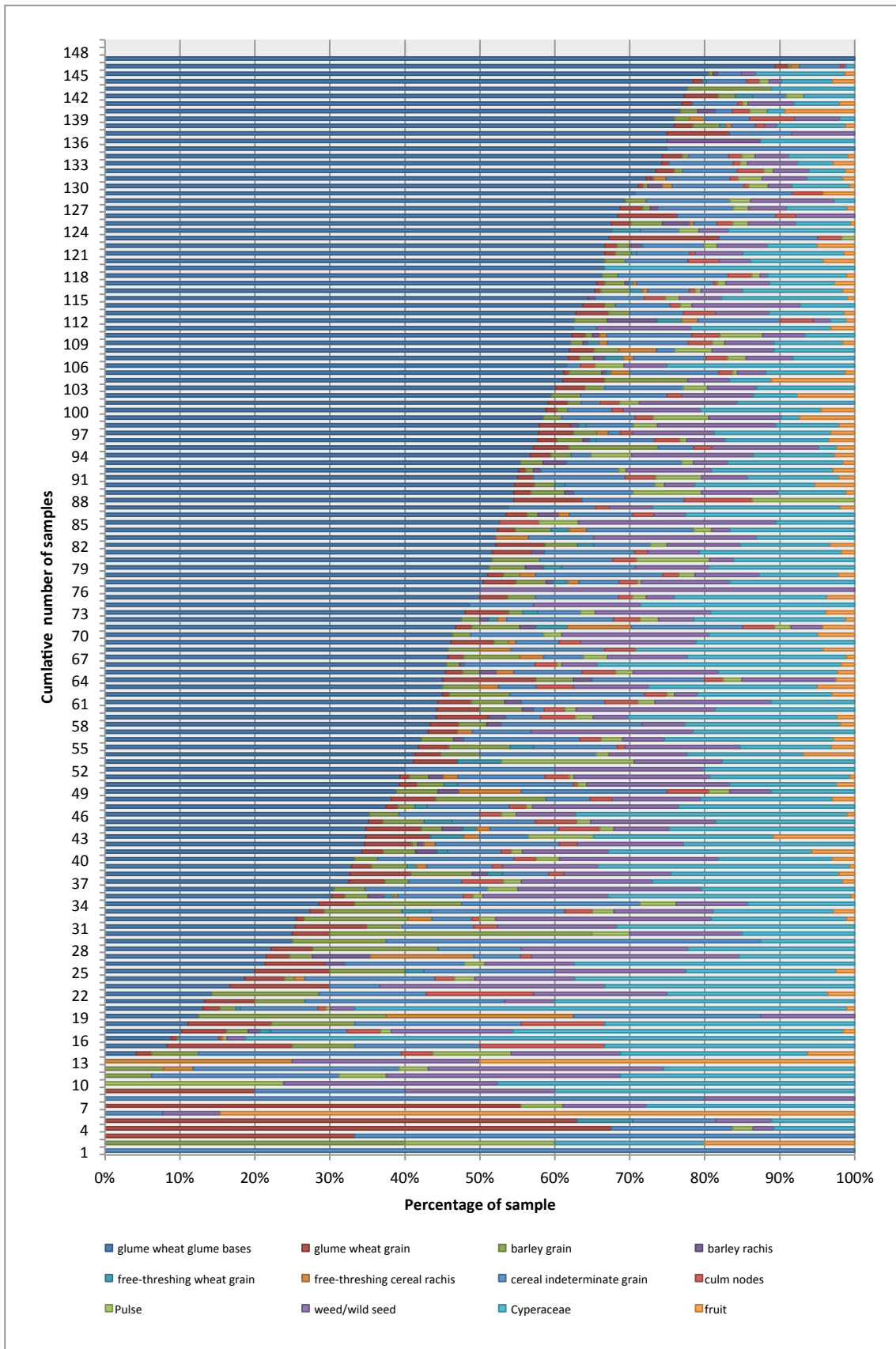


Figure 10.3. Bar charts showing the percentages composition of samples: Ordered by glume base percentage



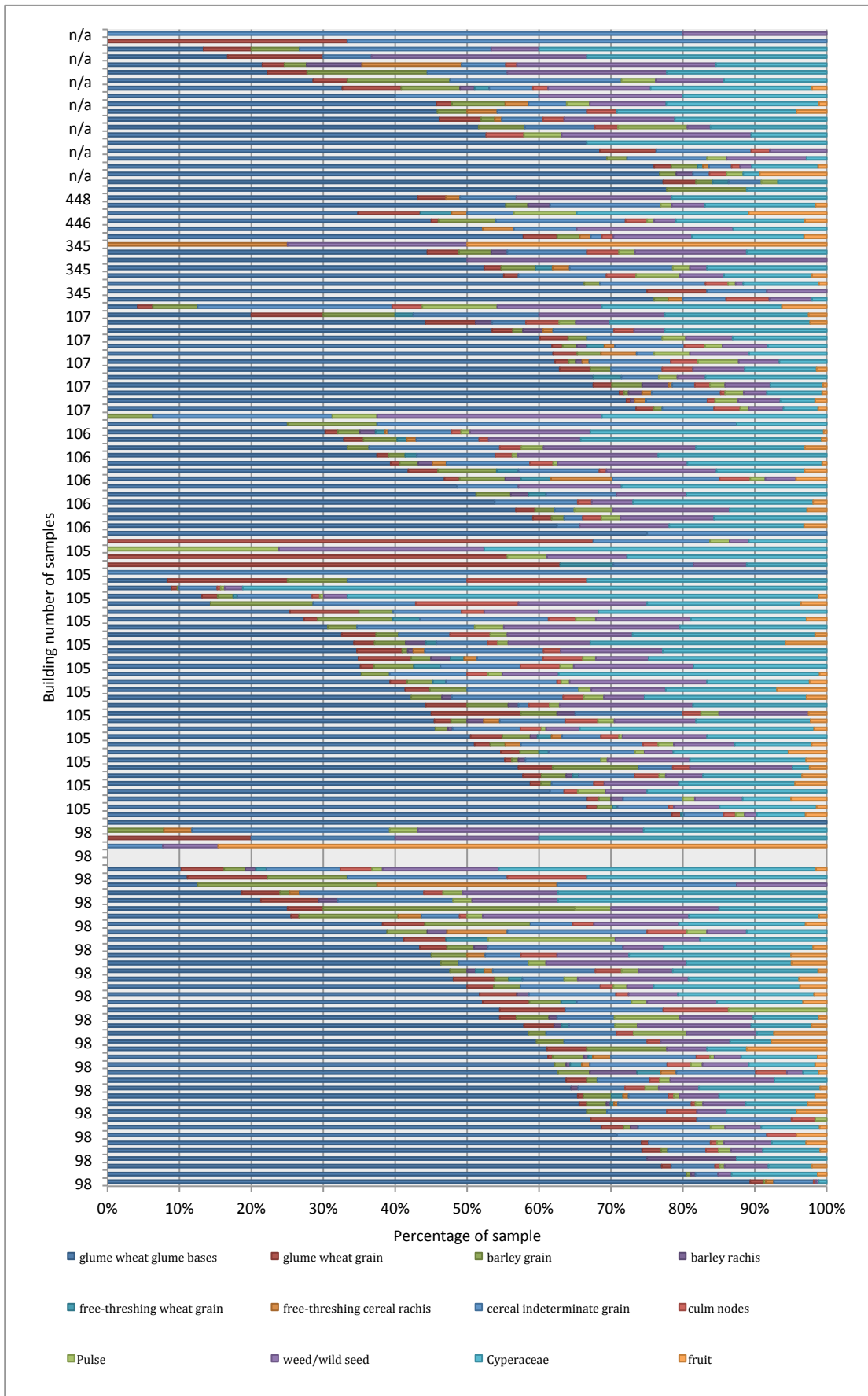


Figure 10.4. Bar charts showing the percentages composition of samples: Ordered by building or space from which they originated.

The density of items (Fig. 10.2) is variable, ranging from samples with no material to >100 items per litre sediment processed. Relatively high densities of items occurred mainly in samples derived from building materials: the flotation of single mud bricks produced some of the highest concentration of botanical items per litre of soil floated (up to 56 items per litre) (Fig. 10.2). The main exception to this is the sample from unit (16969) in building 98. This sample was the densest sample floated, with 108 items per litre. Its high density is attributable to the high abundance of glume bases within the sample. Some of the lowest density samples were from plaster layers.

Comparison of the buildings/spaces did not reveal any dramatic differences. Similar trends occur within each of the building/space with regards to density, abundance and relative proportions of categories (Figs 10.1-4). It appears that there is a typical 'background noise' signature throughout all samples, consisting of glumes, some cereal grains and wild plant seeds, predominantly sedge seeds.

The two most abundant categories of archaeobotanical material were glume bases (the hulls that retain the grains of glume wheats in spikelets after initial threshing) and sedge seeds. More than half of the samples were comprised of >40% glume bases, with only ten samples having no glume bases (Figure 10.4). Sedge seeds comprised a lower proportion of each assemblage but also have high ubiquity with only 12 samples not having any sedge material. The wild/weed seed category also has a high ubiquity, with 139 samples out of a total of 149 having at least one weed seed. Regarding the major crop types, barley grains are the dominant cereal grain within the assemblage, with 111 out of 149 samples containing specimens. Glume wheats and free-threshing wheat grains are found in lower numbers compared to the barley (87 samples containing glume wheat grains and 38 containing free-threshing grains). The other crop taxa are the pulses, which are much less frequent than the cereal grains and comprise less than 1% of the total assemblage; lentil is the most frequent pulse occurring in 29 of 149 samples.

### **In-depth analysis**

As part of my DPhil research, I fully analysed 27 samples from Trench 5, selected on the basis of contextual integrity and archaeobotanical richness. The 1 mm material was sorted in its entirety or until 500 crop items were identified. The 0.3 mm material was also sorted, often following subsampling to no less than 1/8<sup>th</sup> of the 1mm sorted. All of the 4mm material was examined. Taxa were identified to species wherever possible.

### **Crops**

The research positively identified occurrences of ten crop species (Table 10.1). For all cereal species both grain and chaff material was identified. Of note is the identification of the "new type" glume wheat in both grain and chaff from a couple of contexts, suggesting continuity in the use of this crop from the East Mound (Bogaard et al. in press). The dominant crop remains are glume bases: only one sample did not contain glume bases. Of the 26 samples, which did, glume bases made up over 65% of the crop components. The 'new type' glume bases occurred in similar proportions to emmer glume bases in these samples, while einkorn was present at low levels in a few samples. Hulled barley grains were the most ubiquitous cereal grain within the assemblage, with 23 out of 27 samples contained specimens. Hulled barley was also the most abundant grain, with 84 grains positively identified.

Examination of the crop spectrum shows a dominance of cereals grain over pulses seeds (Table 10.1, Fig. 10.3). Whether this is purely taphonomic (e.g. the cereals are better/more likely to preserve) or is indicative of actual use requires more work.

Number of samples: 27		Ubiquity	Abundance	
		<b>Number of samples</b>	<b>Total sum</b>	<b>Maximum per sample</b>
<u>Cereals</u>	<b>Latin names</b>			
Naked barley grain	<i>Hordeum vulgare</i> var. <i>nudum</i>	6	6	1
Hulled barley grain	<i>Hordeum vulgare</i>	23	84	9
Hulled barley grain, straight	<i>Hordeum vulgare</i>	8	10	2
Cf. Hulled barley grain	<i>Hordeum vulgare</i>	1	1	1
Barley grain indeterminate	<i>Hordeum</i>	21	87	9
Barley rachis	<i>Hordeum</i>	9	14	3
Free-threshing wheat grain	<i>Triticum aestivum/durum</i>	8	11	3
cf Free-Threshing grain	<i>Triticum aestivum/durum</i>	4	7	2
Bread wheat rachis	<i>Triticum aestivum</i>	10	28	5
Einkorn grain, one-seeded type	<i>Triticum monococcum</i>	3	3	1
Einkorn grain, one-seeded possible wild type	<i>Triticum boeoticum/monococcum</i>	9	10	2
Einkorn grain, two-seeded type	<i>Triticum monococcum</i>	3	5	3
Einkorn grain, cf. one-seeded type	<i>Triticum monococcum</i>	2	4	3
Einkorn grain, cf. two-seeded type,	<i>Triticum monococcum/Triticum dicoccum</i>	2	3	2
Einkorn grain, two-seeded type/Emmer grain	<i>Triticum monococcum</i>	1	1	1
Emmer grain	<i>Triticum dicoccum</i>	7	10	3
cf. Emmer grain	<i>Triticum dicoccum</i>	1	1	1
"New Type" glume wheat grain	<i>Triticum</i> sp.	5	6	2
cf. "New Type" glume wheat grain	<i>Triticum</i> sp.	3	4	2
Glume wheat grain indeterminate	<i>Triticum</i> sp.	11	32	5
Glume wheat grain indeterminate- 2 seeded type	<i>Triticum</i> sp.	11	33	8
Wheat indeterminate grain	<i>Triticum</i> sp.	26	174	15
Cereal indeterminate grain		27	287	23

Chaff				
Einkorn glume bases	<i>Triticum monococcum</i>	4	7	3
Emmer glume bases	<i>Triticum dicoccum/Triticum momococcum</i>	23	366	147
Emmer/New Type glume bases	<i>Triticum dicoccum</i>	26	578	76
"New Type" glume bases	<i>Triticum sp.</i>	26	362	53
Terminal glume bases	<i>Triticum dicoccum/sp.</i>	18	119	16
Cereal indeterminate glume base		26	1268	181
Pulses				
Bitter vetch	<i>Vicia ervilia</i>	4	4	1
Chickpea	<i>Cicer arietinum</i>	0	0	0
Lentil	<i>Lens culinaris</i>	13	20	3
Pea	<i>Pisum sativum</i>	5	5	1
cf. Pea	<i>Pisum sativum</i>	1	2	2
Vicia/Lathyrus type	<i>Vicia/Lathyrus</i>	2	2	1
Lathyrus	<i>Lathyrus sativus</i>	1	1	1
Pulse indeterminate	Leguminosae	21	38	6

Table 10.1. The crop taxa found identified in the 27 West Mound samples fully analysed showing the ubiquity of the taxon, its total number of identified items and the maximum number of items per sample.

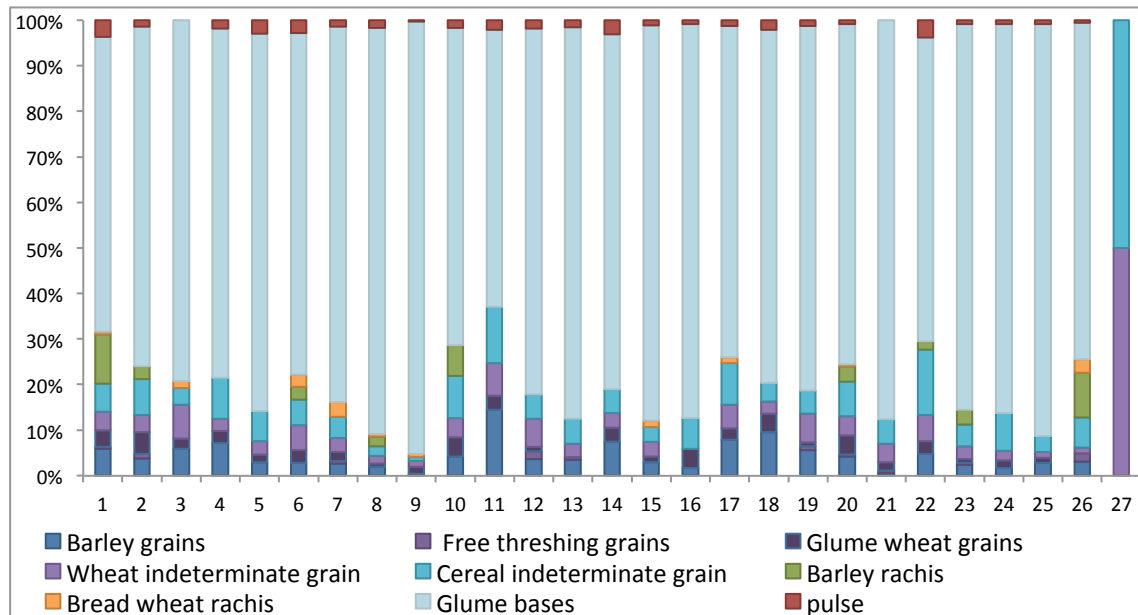


Figure 10.5. A bar chart showing relative proportions of crop types identified in the fully analysed samples

## Wild plants

A total of 85 different wild plant taxa have been identified. A small proportion of these taxa is edible and includes wild almond, plum, pistachio and hackberry.

A wide range of 'weed' seeds was identified and includes classic arable crop weeds as well as wetland/marshy species. High numbers of small-seeded grasses and crucifers are notable. The dominant taxon is a member of the sedge family: *Bolboschoenus* sp., which is ubiquitous.

## Conclusions and further research

Preliminary analysis of the Trench 5 archaeobotanical assemblage indicates similarities as well as differences in comparison to that of the East Mound (Bogaard et al. in press). The overall composition of the assemblage is comparable to the East Mound assemblage, with a similar "background signature" of glume bases, some grains and weed seeds consisting mainly of sedge seeds (Bogaard et al. in press). One notable difference is the significance of hulled barley grains on the West Mound compared to the co-dominance of naked barley and glume wheat grains on the East Mound (Bogaard et al. in press). Differences are yet to be fully explored, as in-depth analysis is ongoing.

The high abundance of glume wheat chaff supports the idea that these crops were stored as spikelets and dehusked frequently, as opposed to being fully threshed upon harvest. This most likely occurred on a day-to-day basis, as the grain was required. This high abundance is seen in more detail in the 27 samples analysed in depth. Glume bases far outnumber the amount of free-threshing wheat or barley rachis identified within the samples. The dominance of glume bases suggests differences in the crop processing sequences of these two types of cereal.

A number of different theories have been proposed to explain the reason for storage within glumes. It is possible that the storage of grains within the glumes provided protection during storage against pests, fungal infestation and inclement weather (Sigaut 1988). Also storage of grain within the glumes spreads processing labour throughout the year instead of being concentrated during one or two key months following the harvest. For social groups that rely on the labour available within a household or family group, storage of glume wheats within their glumes may have been the only way to fully harvest a crop with the labour available to them. Such reasoning has led to inferences about social organisation (e.g., whether co-operation was household- or community-based (Stevens 2003)). Related hypotheses will be tested later in this research.

The preliminary data also indicate that the inhabitants of the West Mound had access to wetlands, as demonstrated by the ubiquity and abundance of sedge seeds. The hypothesis that the region was becoming more arid lacks substantial support from the archaeobotany. However, analysis of the ecological niches of all weed seeds found is yet to be conducted.

In addition to cultivated crops, some evidence for the collection of wild foods is starting to emerge. The presence of pistachio nutshell fragments, as well as fruit stone fragments from wild almond and plum, demonstrates that wild foods within the landscape were extensively utilized. Hackberry



(*Celtis*) stones are also found within the assemblage, but are presumably over-represented relative to other taxa due to the fact that these fruit stones are preserved without charring.

The presence of a number of small-seeded grasses within the 0.3 mm fraction of the flots could be suggestive of the use of dung as a fuel. Previous research on the East Mound suggests that the presence of taxa such as *Sporobolus*, *Crypsis* and *Aeluropus* reflect dung use (Bogaard et al. in press). Further research into this issue is required before any conclusion can be made.

Further research will be conducted on this material in the coming year, with statistical analysis to explore trends in the distribution of items. Understanding the ecology of wild/weed seeds will shed light on relevant habitats, including arable fields. Stable isotope analysis of crop remains from the site is also planned with the aim of determining specific aspects of crop growing conditions (e.g. water status), which have implications for farming practices.

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## 11. Çatalhöyük Figurine Report 2013

Lindsay Der<sup>1</sup>, Lynn Meskell<sup>1</sup>, Carolyn Nakamura<sup>2</sup>

<sup>1</sup>Stanford University, <sup>2</sup>Leiden University

This year only 19 figurines were recorded, largely because excavation was focused on buildings rather than middens from which most of our examples are derived. The 2013 corpus can be broken down into 7 quadrupeds, 6 horns, (13 zoomorphic total), 3 abbreviated figures and 2 anthropomorphic examples. The two human figures closely resemble those we have identified previously. Figurine 30242.X1 was recovered from a layer of fill in Space 508 from the TPC area and is a clay torso with a protruding belly and sway back. The head is missing and it was also broken at both legs and arms. The second human form also found in TPC, 30783.X1 in Space 516, has an overall rectangular body shape, with a large broad back, a non differentiated head, but with a delineated stomach and breasts. No legs were depicted and the arms would have been disproportionate to the body. Again in TPC Space 484, a large quadruped 30754.X2 was recovered. This is an unusual example with a stocky body, long tail, and short legs reminiscent of a feline. Unfortunately the head is missing but the neck appears very thick in comparison to the torso. The back is relatively flat but there is a small hump near the neck. This quadruped is also hollowed out underneath the torso, which is another unusual feature for animal figurines found at the site.

Since several researchers on site are interested in looking more closely at the zoomorphic forms other types of analysis have been conducted on this specific dataset. For example, Der is conducting thesis research to explore human-animal relations broadly across the site, Meskell and Martin have focused on comparisons with the faunal material (Martin & Meskell 2012) and Meskell is working on ideas of scale and species specificity. To that end, Der conducted a pilot study on all the quadrupeds now held on-site using XRF with the aid of Lee Drake (Bruker Elemental) and Adam Nazaroff, and with many helpful comments by Chris Doherty, and we thank them for their support this season.

### **X-ray Fluorescence (XRF) and the Quadruped Figurines**

Contribution by Lindsay Der

A new analytical technique explored by the figurines team this year was that of x-ray fluorescence to investigate elemental composition. There are several advantages to handheld portable XRF (HHpXRF) which are particularly relevant to the Çatalhöyük figurines. Perhaps most importantly, HHpXRF is non-destructive and can be deployed in the field. Both these points are significant in light of strict export and permitting regulations which prevent analysis of the figurines beyond the field laboratory. In addition, HHpXRF can measure a large number of samples in a relatively short time at little cost. In the 2013 field season, we primarily focused on the quadruped figurines, but for comparative purposes our sample also included some bucrania, anthropomorphic, and abbreviated figurines. Our objective was to use geochemical data generated by XRF to help determine the level of variability in the clay chosen for figurine manufacture. Our analysis is qualitative as we do not have samples of source material with which to compare our figurine measurements. Here we point to the work of Forouzan et al. in which portable XRF was utilized to identify clay populations in the artifact assemblage of Early Chalcolithic zoomorphic figurines, sling bullets and tokens at Chogha Gavaneh, Iran (2012). Previous research at Çatalhöyük regarding clay sourcing, including

petrographic analysis (Doherty and Camizuli 2008; Doherty 2013), has shown that figurines were largely manufactured from backswamp clay throughout the Neolithic occupation of the site. Further, although Doherty identifies six main material types for clay objects, he notes that these material types were either derived from Pleistocene Lake Konya clays or Holocene alluvial clays, the latter possibly burying the former. Only pottery is believed to have been manufactured from clays sourced beyond the site.

We used a handheld XRF device from the Bruker Elemental AXS Tracer series and SP1XRF software to gather spectra for a total of 83 quadrupeds, 4 bucrania, 2 abbreviated forms and 1 anthropomorphic figurine. We did not select for particular areas of the site or occupational levels. Rather, we simply sought to analyze as many of the quadrupeds as possible. It is worth noting here that only a partial selection of the quadruped assemblage resides in on-site storage with the majority residing in various museums in Turkey. Likewise, we measured figurines that fell within the complete range of quality, from the finely modelled to the coarser examples. At the suggestion of the Bruker representative, measurements were taken with a baud rate of 115200 at 40 kV for 60 seconds. We used an anode current of 32 $\mu$ A and a red filter (1 mil Al, 1 mil Ti, 1 mil Cu). For spectra analysis we used ARTAX software, defining our own parameters for evaluating the data instead of deploying the default ceramics method in the program. Under our own parameters, we identified the following elements: Al, Ar, Au, Ba, Bi, Br, Ca, Cl, Cr, Cu, Fe, Ga, K, Mn, Nb, Ni, P, Pb, Pd, Rb, Re, Rh, S, Si, Sn, Sr, Ti, Y, Zn, Zr. Of particular concern were the trace elements, such as the rare earth elements of Rb, Zr, and Sr. Emphasizing these rare earth elements can help to counteract error generated from inconsistent absorption of x-rays on uneven surfaces such as the three dimensional and curved planes which make up the figurine forms (Frahm 2013:1082; Liritzis and Zacharias 2011:132-3; Forster et al. 2011).

Spectra obtained for the clay figurines at first glance seemed to indicate relatively homogenous geochemical signatures (Fig. 11.1). However, bivariate comparisons of several trace elements show that there appears to be a continuum from marl to silty clays and that some figurines appear to be

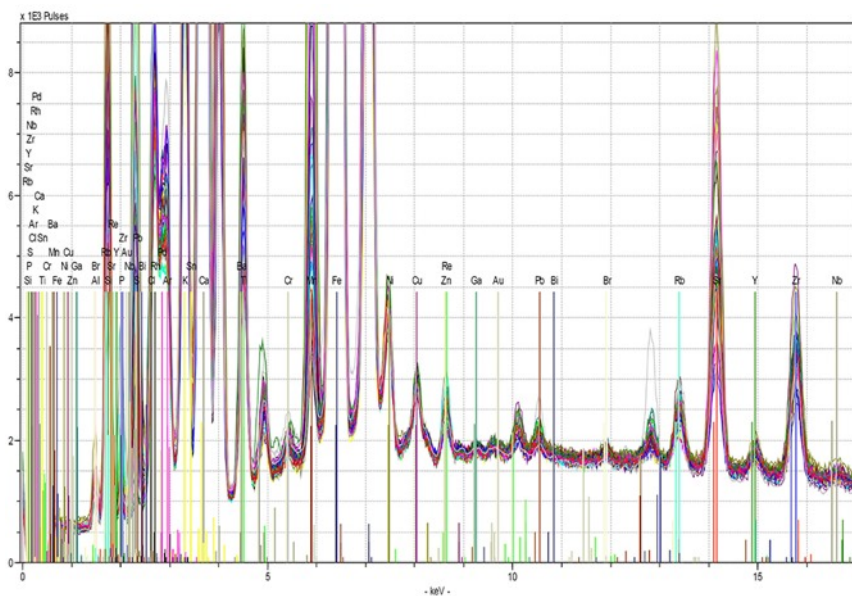


Figure 11.1. Spectra of clay figurines (has been smoothed and normalized for comparison)

outliers (Fig. 11.2, 11.3, 11.4, 11.5). One disadvantage of portable XRF is that it does not account for differing concentrations of elements, only ratios, which can be problematic for qualitative analysis (Shackley 2010:19). Consequently, using spectra readings alone can be very misleading as artifacts with the same mineralogical compositions but different elemental proportions will appear to be from the same source. The similarity in the elemental make-up of figurine clays can be attributed to the

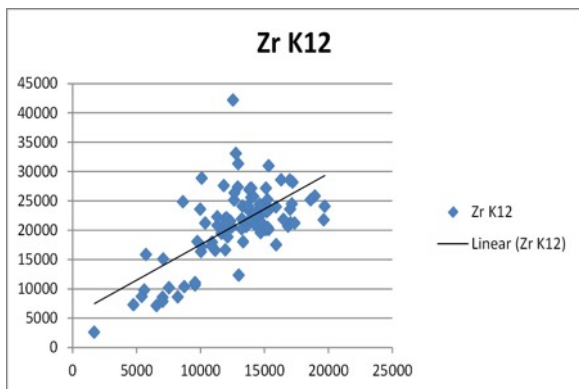


Figure 11.2. Zr vs. Rb bivariate comparison

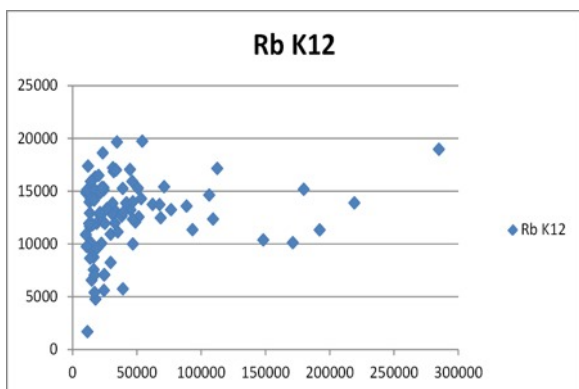


Figure 11.3. Mn vs. Rb bivariate comparison

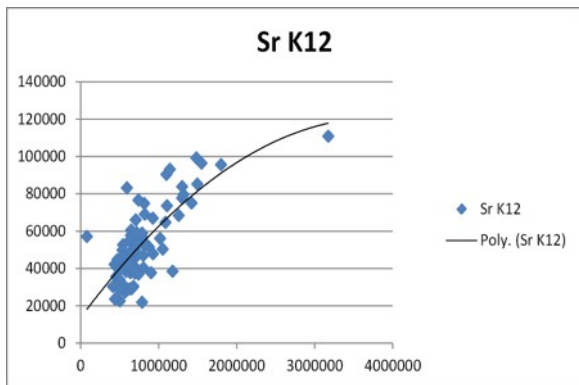


Figure 11.4. Ca vs. Sr bivariate comparison

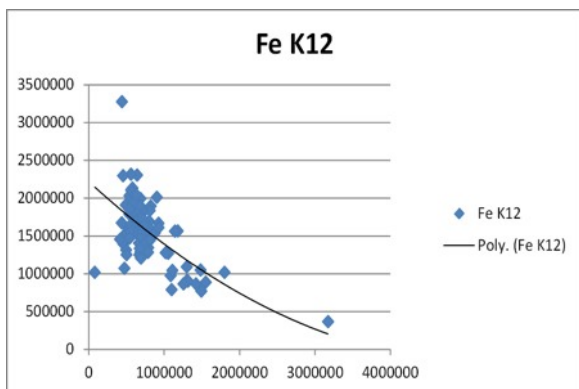


Figure 11.5. Ca vs. Fe bivariate comparison

clays at Çatalhöyük having originated from the same mountains.

As a control, we also analyzed the elemental composition of a stone quadruped figurine (Fig. 11.6). Calcium and strontium measurements are greater for the stone example (19101.H3) which matches our expectations given that this figurine was carved from tufa. In contrast, the clay figurine (14186.X16) displays results consistent with marl. However, both the clay and stone quadrupeds appear to have similar chlorine measurements, likely indicative of some sort of contamination.

In addition we chose to compare XRF data from a mudbrick and red clay packing sample taken on-site this year to our clay figurine measurements (Fig 11.7). Again, the spectra seem quite similar. However, a bivariate comparison of calcium and iron sets the red clay packing apart from the mudbrick and figurines (Figure 8). This result is not altogether surprising given that mudbrick, like the figurines, was manufactured from backswamp clay until level South M. After South M, mudbricks are found with more silty clay fabrics due to the depletion of backswamp clays and the subsequent need for alternative clay sources (Doherty 2013).

The application of HHpXRF in archaeology has been a widely debated topic in recent years (Liritzis and Zacharias 2011; Frahm and Doonan 2013; Frahm 2013; Shackley 2010). Despite its convenience and potential, a literature survey conducted by Frahm and Doonan (2013:1429-30) found that only 4% of researchers utilized this technique in an on-site laboratory or fieldhouse, perhaps due to a preference for benchtop XRF machines and laboratory conditions to which many researchers attribute greater reliability (Shackley 2010). However, tests on obsidian mimicking non-laboratory conditions show that geochemical measurements using portable XRF are credible so long as measurements were taken in a consistent manner (Frahm 2013). In these tests Frahm was able to achieve a 94% success rate regardless of ‘sub-optimal’ conditions which included

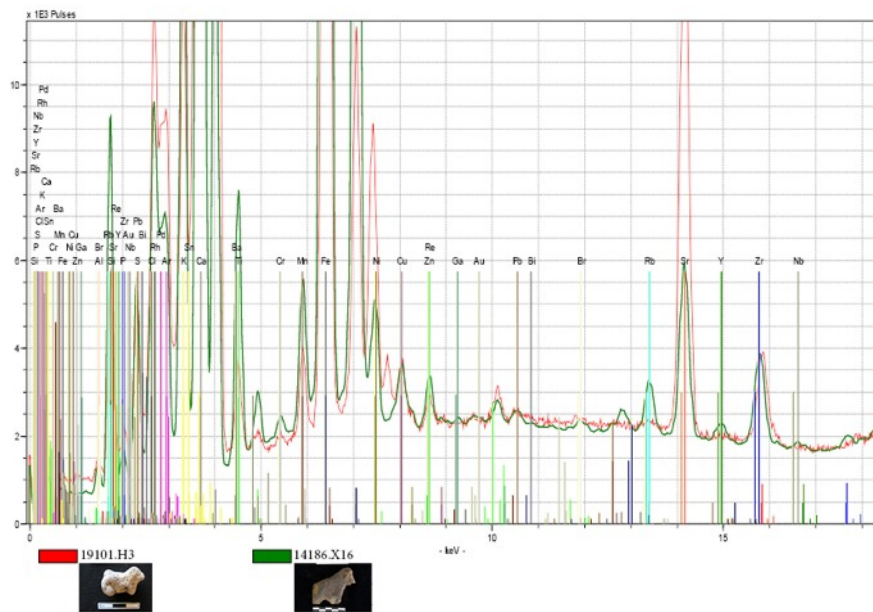


Figure 11.6. Spectra of clay quadruped figurine vs. stone quadruped figurine.

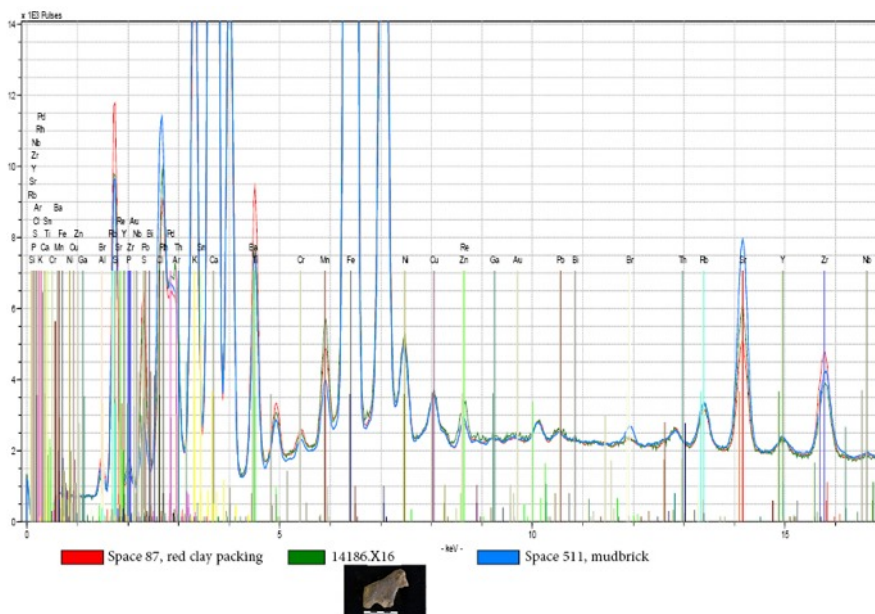


Figure 11.7. Spectra of clay quadruped figurine vs. red clay packing vs. mudbrick

a lack of calibration and the presence of irregular artifact surfaces. Thus, these tests demonstrate that precision is crucial to the identification of sources amongst artifacts whereas accuracy plays a greater role in studies that attempt to match measurements to known standards.

Several criticisms have been levelled against portable XRF, including minimal size requirements for maintaining accuracy (Frahm 2013:1082). In our case, this was a non-issue as all the figurines measured had a thickness greater than 2mm and a diameter larger than 1mm. However, had we chosen to measure the zoomorphic horn figurines, many of which fall below these size thresholds, this would have likely played a factor in data reliability. On the other hand, the deposition of figurines in secondary contexts, such as middens and fills, almost certainly affected our results.

Figurines were in contact and mixed in with a variety of material including soil, other artifacts, and faunal remains (Meskell et al. 2007; Meskell 2008). Beyond any prehistoric contaminants, modern residues from artifact handling, storage, etc. are also potential factors. The resultant surface contamination makes it difficult to tell whether the XRF readings are of the clay's geochemical signature or that of the contaminant. One way to potentially mitigate error and surface heterogeneity would be to analyze multiple areas on each figurine. Due to time constraints, we were unable to implement such a procedure this season. Still, this is not a foolproof solution as the entire object may have been contaminated. Moreover, internal variability is a known issue in pottery analysis (and by relation, clay objects) (Liritzis and Zacharias 2011:119).



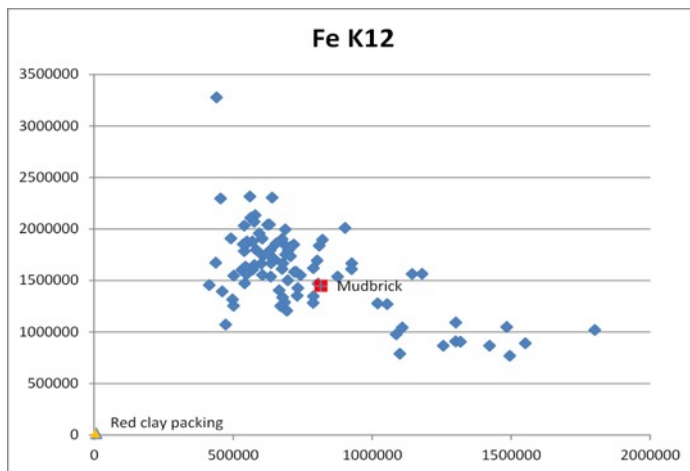


Figure 11.8. Ca vs. Fe bivariate comparison. The blue markers delineate clay figurines while the red and yellow markers indicate the mudbrick and red clay packing samples respectively.

Perhaps the largest difficulty we found with using HHpXRF to evaluate clay sources for the figurines has to do with the characteristics of the Çatalhöyük clays themselves. Clay contains light elements, such as aluminum and silicon, which XRF cannot detect or tends to underrepresent. Likewise, the high magnesium content of clays does not read in the XRF results, nor does the sodium which characterizes the volcanic material. Nonetheless, we still believe that HHpXRF can be a useful tool in investigating clay sourcing when used in combination with other analytical methods.

## Animal figurines and material scales at Neolithic Çatalhöyük

Contribution by Lynn Meskell

The Çatalhöyük project currently has recorded some 2500 figurines of humans, animals and abbreviated forms throughout the 1400-year sequence. We have done intensive work on densities of all figurine types through time, by individual excavation unit. There is a peak in animal figurines (including both quadrupeds and isolated horns), from the South Area in Level P and in the North Area (specifically the 4040 excavation area) at Level I. These two levels are roughly contemporaneous in date though come from the south and north areas of the East Mound respectively (c. 6400–6300 cal. bc). The 4040 excavation area of the site has the greatest concentration of quadrupeds and the widest range of taxa, including much less frequently depicted boar, bear and fox, plus a wider variety of forms. During this time there are significant changes in house size, environmental shifts towards an increasingly dry landscape, change in mud-brick composition, an increase in ceramics, cattle domestication and an increase in sheep and goat herding with more complex herd management suggested (Henton 2013; Russell et al. 2013). In the case of Çatalhöyük the focus is upon crafting exotic animals, with an eye to the world outside, even though domesticated animals were assuming a greater role in village life. In that way figurines are signifiers of a larger landscape, a world of wider resources, experiences, and places.

One interpretation is that these objects were more akin to *proxies*: physical embodiments of real or desired animals that could be hunted, others herded, some owned, borrowed, some shared and eaten. Proxies could be used in hunting plans, negotiations about flock managing, exchanging, or distributing animals themselves and parts thereof, or employed in narrating stories or passing on knowledge about animals — their behavior, products, location in landscapes (Martin and Meskell 2012). In the upper levels of the site we know from the human remains that there was increased mobility for both males and females (Larsen et al. 2013), evidence that fits nicely with the increasingly wide use of the landscape for herding sheep and managing domestic cattle (Russell et al. 2013; Henton 2013). In contrast, wild bulls play a disproportionate role in feasting and

architectural installations during the same period (Russell, et al. 2013: 250). Taken together, the consumption, curation and display of certain wild species increases at a time when people were connecting to an expanding world beyond the site.

Considering the relationship between the human maker and the thing reduced (the animal) forces us into ‘an anthropocentric world where the scale of the human dictates all spatial relationships’ (Bailey 2005: 29) and has the concomitant effect of mastery. Yet if we look comparatively at the size ranges of both animal and human figurines it is clear that there is no natural or realistic size relationship, in fact many human figures are often smaller than their zoomorphic counterparts. Thus both sets of figurines were not meant to realistically work together, to be assembled or be in obvious narrative dialogue together. Human figurines likely signify concerns like personhood, aging, sexuality, maturity and a pre-occupation with flesh (Nakamura & Meskell 2009). Their roles, like their animal counterparts, could be interpreted as didactic. Animals too could be shown in various stages of their lifecycles, indicated for example by the rounded nose of adult boar or the flat upturned snout of a juvenile (Martin and Meskell 2012: 411). Their attention to anatomical species-specific detail suggests a familiarity, knowledge and insight that was shared and circulated as well. It is not simply that they are proxies for hunted beasts, and only 12% show signs of stab or puncture marks. A broader interpretation might be that ‘control’ of animals was the wider preoccupation — the process of moulding them between human hands, showing and representing them to others, ultimately leading to wider discussion, familiarity and negotiation.

The range of taxa identified in the figurine corpus does not include any animal or ‘type’ that has not been found in faunal remains at Çatalhöyük. Yet the faunal remains include a broad range of animals, such as birds, fish, rodents, small carnivores and reptiles that are not found as figurines. People most commonly made cattle figurines (44), followed by boar/pig (15), then equid (9) and deer (8). Caprines overall number 11, and the representations of goats far outnumber sheep. This presents an opposite picture to the ratio of sheep:goat in the faunal remains, where sheep always outnumber goats by far (Russell & Martin 2005; Russell et al. 2013). There are even examples that could have been fashioned by the same individual, such is their similarity. Two equids from the South Area (12508.H3 and 12502.H4) are almost identical, as are two 22 foxes or small carnivores (12648.X2 and 12980.H8) both from 4040H. Two very similar goats (2250.X2 and 19305.X5) are both small, finely modeled with extremely detailed ears and horns. People at Çatalhöyük favoured making a particular range of quadrupeds (primarily cattle, boar, equid, deer, and goat), rather than reptiles, felids, birds and other local taxa, and indeed rather than domestic sheep. The majority of figurines probably represent wild animals, with the most being wild cattle, so we might say that ‘wildness’ was prized in some way (Martin and Meskell 2012: 415). But this further prompts us to question why ignore the animals with which one has greater familiarity and daily proximity — was it that very familiarity that bred contempt?

### **Species specificity**

For Bailey (2005: 29) the miniature is not a model, it does not convey complete accuracy and precision, rather it results from human experimentation with the wider world. Each figurine combines the maker’s eye, hand and knowledge to manipulate the world. I would go further, suggesting here that small animal figurines from Çatalhöyük are about subjective and selective representation and care; they materially embody the inhabitants’ preoccupations and concerns.

Indeed their small size forces a kind of selectivity and so archaeologists must be attentive to what is detailed and what is omitted. Miniaturism gains force, according to Bailey, from its inherent qualities of compression. As a result value is enhanced: 'miniaturism concentrates and distils what is normal in people's routine day-to-day activities and thoughts and then produces a denser expression of that part of that reality' (2005: 32).

Recalling that the miniature affords selective representation and prioritization, I turn now to the Neolithic preoccupation with rendering certain animal traits and disregarding others. For example, figurine makers were not interested in showing the texture of animal coats, their particular patterns or other marking, which they certainly had the skill to perform if desired. Although in some cases equids' manes or boar's backs were elaborated by pinching, making ridges or scoring (e.g. 12972.H1, 12508.H3, 12524.X8). In general it is the shape of the animal head and body that is salient rather than its exterior (for parallels see Horwitz & Goring-Morris 2004: 172). Taken together and examined as a corpus they are highly detailed, finely modeled and anatomically specific. They seek to capture the quintessential elements of each animal species and there is a careful, often exuberant, selection of the horse's mane, the boar's snout, the deer's antlers and the goat's beard. This tendency lends weight to the idea that they served didactic purposes and that they were knowledgeable conduits between humans and between other media.



Figure 11.9. Dog figurine 19342.X16

Rendering heads and tails in detail, regardless of figurine size or modeling quality, was paramount. We see a similar tendency in the anthropomorphic examples, where attention to heads, headlessness and head removal (Meskell 2008) as well as delineating the buttocks (Nakamura & Meskell 2009) was a central concern. But with the animals it is always the presence of the head, the attention to particular head shape, and correct rendering of the ears, horns, tusks and beards that is compelling. The ratio of head to body among the quadrupeds also underlines the dominance of the head over the body (1:1 ratio = 4%, 1:1.5 ratio = 29%, 1:2 ratio = 38%, 1:2.5 = 16%, 1:3 = 13%). Louise Martin developed a methodology to record the morphology of the discrete 'body parts' that make up each figurine, such as heads, horns, necks and torsos, legs and tails. In this study of several hundred quadrupeds Martin found that head shape is consistently species specific and ranged from being long and pointed to short and blunt, to triangular and wedge-shaped. Wild cattle, the most

prevalent animal depicted, have a heavy triangle wedge-shaped head whereas deer have finely modeled heads and relatively long narrow snouts (one has evidence of removable antlers). Equids have long faces with rounded or pointed snouts, sometimes with upstanding ears quite different from those of other ungulates and in one instance a mane. Horn morphology and placement also reveals detailed knowledge: whether the horn base was round, ovoid or flattened, whether they came off at the side of the head or from the top, 'V'-shaped or vertical (see also Schmandt-Besserat 1997). For cattle, the shape of the head, placement horns, followed by the bulk of the neck and shoulders were the critical signifiers (Martin and Meskell 2012). This same pattern is observed in the treatment of plastered faunal installations where the head and horns of cattle is the primary common, at the expense of the rest of the animal (see the examples of Buildings 52 and 77, Russell et al. 2013: 221).

Equally important as the head was the presence of a tail, regardless of figurine type, size or modelling quality. While particular tails seem to characterize equids and carnivores, for most of the quadrupeds it was the persistent presence of a tail that was critical rather than its accuracy to species. Animal tails are typically large and exaggerated in the wall art (bulls, deer, boar, leopard). Moreover, our analysis shows that despite a wide variation in the manufacture, morphology and sizes of figurines classed together as a 'taxon', these bodily preoccupations with heads and tails do seem to hold from the earliest to the latest Neolithic levels of the site (Martin and Meskell 2012: 417). The remainder of the quadruped body is often robust and nondescript, the legs non-specific, and the hoofs are basically absent. Many of the quadrupeds are made with deliberately flattened hooves or bases indicating that they were meant to be free-standing, as opposed to many anthropomorphic examples that do not and thus may have been more mobile (Meskell 2007). Quadrupeds often have flattened undersides, even where the four legs are schematically depicted. The base of the legs, since there are no hoofs, is often simply squashed. Hence they are not reliant upon being held or placed in stands and could easily have been assembled in groups.



Figure 11.10. Bear figurine 19390.x3

People at Çatalhöyük were concerned with crafting a limited range of types: primarily ungulates and herbivores (cattle, equid, sheep, goat, cervids), one omnivore (boar), and far fewer representatives of carnivores (dog, fox, felid). With the exception of the carnivores, most of the represented animals are found as food remains on site. This pattern is also evident in the wall paintings and reliefs where wild cattle dominate (46% in the wall reliefs) yet only constitute 15% overall of the animal remains

deposited on site (Russell & Martin 2005). Domesticated sheep largely comprise the site's faunal remains and regular source of meat consumption (at least 56%), yet are never the subjects of pictorial representation and their body parts reported in wall reliefs in just 19% of cases, although many identifications may be doubtful (Russell & Meece 2005, Table 14.5).

### **A matter of scale**

Douglass Bailey (2005) has written eloquently on matters of scale with human figurines, an approach that is even more compelling when applied to an animal corpus and its related faunal remains and representations on a site like Çatalhöyük. Too small a scale, he notes, and the figurine and the details become blurred and detailed rendering becomes impossible. Too large a scale becomes redundant or physically impossible. All scale is related to the human body as the quintessential relationship, so object making is either life-size, smaller than life-size or larger than life-size. Here I examine the embodied differences of engaging with figurines as compared with the significantly larger, more imposing plastered features and narrative wall paintings featuring humans and animals together. While the concerns for the same species and their anatomical characteristics remains constant, the social lives of these figural representations was likely very different.

I have argued above that the recognizable characteristics of individual figurines to an animal taxon seem to have been important. Those concerns also extend beyond the figurine corpus and are also present in the species specificity of the wall paintings (Nakamura & Meskell 2006; Hodder 2006). However, wall paintings depicting animals are found in only 16 houses, a relatively small number of the total buildings (Czeszewska 2014). Their visual cues might only legible to particular subset of the community, and may actually impose an experience of distance, whereas interacting with the figurines invited a more immediate and perhaps personal connection. Mellaart notes (1967) that the famous bull painting (Shrine AIII.I) was over 6ft long and the wall with the paired leopards (Shrine VI.B.44, painted with over 40 layers) was almost as long. Such monumental productions were not always the norm throughout the site. Mitchell (2006) reminds us that the 'principles of vitalism and animism require that we also take account of what are sometimes called "lower" forms of consciousness—mere sentience, for instance, or sensuous awareness, responsiveness, as well as forms of memory and desire.'

Small, expedient figurines promote a kind of democratization: everyone can make and engage with zoomorphic figurines, as evidenced by their ubiquity and distribution across the site. They are part of a suite of routinized and repetitive practices at Çatalhöyük (Hodder & Cessford 2004). And in the society of things figurines are ready to hand and immediate, while having the capacity to reference more elaborate, complex and highly skilled things that may have been out of reach for some individuals. Here I am thinking of the elaborate plastered, horned benches, wall mounted bucrania (Twiss & Russell 2009) and the large narrative wall paintings. The animal art and body-part installations also show a preoccupation with wild animals such as cattle, boar, deer and leopards, rather than the domesticated sheep and goat that the inhabitants clearly relied on in practice. We might be able to say then, that making figurines was not a mimetic process of food production nor was it focused on the household economy, but rather a broader symbolic economy of desire, distance, danger and possibly even dread (Whitehouse & Hodder 2010; Hodder & Meskell 2011). Moreover, the subjects of the installations overlap significantly with the famous paintings of wild cattle, deer, boar, just as they do with the animal figurines. The images of wild beasts are



represented on a scale that dwarfs human actors, whereas the plastered faunal remains in walls and benches within buildings were obviously to-scale and enabled more lived interaction. The figurines are the opposite, they demand to be regularly handled, manipulated, and mastered. Such a reduction in size demands closer scrutiny and an embodied proxemics. This intimacy might enable new ways of seeing and potentially understanding the subject (Bailey 2005: 38). Taken together, I would argue that these miniature animals effectively connect to, enliven, and make real the major beastly subjects of some historic or mythic events.

Figurines may have had roles in a wide array of real engagements that bound people and animals in the Neolithic in similar ways that the Çatalhöyük wall paintings link with themes of hunting and baiting wild animals, and the animal part installations appear to link with consumption practices of key animals. But unlike these more fixed, displayed animal representations, the figurines seem more likely to be transactional things, made, used and discarded. This interpretation accords well with the depositional context of quadruped figurines in middens and external areas, regardless of where the transactions with real animals and animal carcasses took place, either on or off site. Because of their small size and ease of manufacture figurines could be thought of conduits for social action (exchanges, teaching, negotiations, ritual) that concern human-animal relationships. As Berger (1980: 6) noted in his discussion on looking at animals, it is because their 'lives are distinct but run parallel'. For example, the plastered bucrania and horned benches likely relate to hunting events, that have been accompanied by feasts, that would not have been common events at the site. Given the relatively small number of bucrania preserved from the site, mostly from burned hence preserved buildings, we might posit that such remains were prized and curated, then retrieved and reinstalled in later buildings (Louise Martin pers. comm.). Hunting wild cattle and boar must have involved considerable skill and bravery and would not have been possible for all members of the community. Many of these events must have been relegated to history, and in the case of the wall paintings, probably to generational memory or myth. So in this society of things (Mitchell 2005: 122) figurines offer a mobile and material connector between very different time scales that are represented in other media.

PRESENT: FIGURINES	scale smaller than life size, handle-ability, immediacy, democratization, personal, conduits for representations on different scales
HISTORY: INSTALLATIONS	scale is life size, real animal remains, not personal and not in every house, repeated plastering and painting
MEMORY: PAINTINGS	scale larger than life size, animals dwarf humans, distant history, memory or myth, inaccessible to some

Like humans, animals are born, they are sentient and mortal, Berger wrote (1980: 4). Animals resemble us, but in their anatomy, habits, physical capacities and time they differ. They are both *like* and *unlike*. Wild animals came from over the horizon, thus they belong *there* and *here*. Fabricating and using animal figurines mediates that proximity and difference, the fundamental tension that they are like us and knowable to us, but at the same time fundamentally strange and other. The figural scale is key: they are in our hands, shaped by us. Those possibilities for mastery are more tenuous when one confronts the real remains of large animals curated to their life like forms, or even more compelling, the living beast in the landscape.

Small, finely modeled animal figurines, particularly those of exotic, non-domesticated species dominate the figural assemblage at Çatalhöyük. Attention to species specificity is largely articulated by a consistent depiction of head types and tails. For their makers a figurine should be a recognizable animal, likely identifiable to other people across the settlement (Martin and Meskell 2012: 402). These miniature beasts were regularly made from locally sourced materials, probably in external spaces, and were handle-able, mobile, and widely circulated. They could accomplish what real animals, or plastered animal installations and wall paintings cannot: they enable democratized access and individual social relations between humans and wild animals. Their small scale enabled an intimacy, control and action that are not possible with large-scale paintings or plastered bucrania relegated to a minority of buildings. In this society of things, figurines are conduits between very different material scales and they effectively embody and communicate across the species divide in expedient and intimate ways. From this perspective, the idea of what figurines want or what figurines do might provide more evocative questions than what do figurines mean?

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## 12. East Mound Ground Stone, 2013.

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During the 2013 field season a team of six people worked on the Çatalhöyük ground stone material. Work was divided between assessing newly excavated material from the South, North and TPC areas and recording material from previous excavation seasons. As most of the team members were joining the team for the first time and had no prior experience with the recording of ground stone assemblages, time was devoted in the training of the students in the identification, the initial processing and Level 1 recording of ground stone objects.

The main aims of the 2013 season was

- a) To update the ground stone crate register on the finds database system (see Ground Stone Archive report 2012).
- b) To provide feedback on material derived from excavation units designated as priority during the 2013 excavation season and initiate the recording of newly excavated material from the East Mound.
- c) To continue the detailed recording of backlog material from the South Area excavated during the 2009-2012 field seasons.
- d) To initiate a research project focusing on the study of ground stone material found in clusters in order to address questions about the intentional deposition and destruction of objects.
- e) To initiate a detailed technological and contextual study of all stone axes from both Mellaart's and Hodder's excavations.

### Priority Units

The ground stone team took part at the tri-weekly priority tours and assessed material from 46 priority units excavated during the 2013 excavation season (six from the North area, 22 from the South Area and 18 from the TPC area). In addition, material from 15 priority units from the 2012 field season not assessed in the previous year was studied. All comments from the assessment of the material were entered in the Priority Feedback Quick Entry forms. Below is a preliminary assessment of units of particular interest:

#### 2012

*TPC Area (20255), Sp. 494, F.3978 cluster*

In Sp. 494 an infill deposit and a mixed cluster of artefacts and ecofacts [(20255), (20276), (20277), (20278), (20279), (20280), (20281)] was found between the walls of Buildings 110 and 111 and oven (F.3924). It contained a large amount of bone, pottery sherds, ground stone, shells, and phytoliths. Notable among this cluster was a collection of 199 caprine astragali, 30% of which have been flattened on one or both sides (Best et al. 2012, Archive report 2012). Overall, the quantity of the

material deposited here and the characteristics of the material suggest an act of deliberate deposition as a special/foundation deposit.

The ground stone assemblage from (20255) stands out not only in terms of number of artefacts deposited, but also in terms of object types and raw materials represented. This concentration contains a large number of both worked and natural stones. There is variation in the raw materials represented, mainly at least two different types of andesite, schist, greenstone (possible diabase), limestone, metamorphosed limestone/marble, quartz, crystal, chert, and sedimentary quartzite. Upper and lower grinding tools (i.e. querns and grinders) are the main tool types occurring within this deposit, while there are also two possible examples of grinding tool rough-outs, debitage from the production or modification of grinding tools (angular waste by products, flake and micro-debitage), polishers, an abrader, a possible palette, small-sized stone balls, seven unmodified pieces of crystal, natural limestone pebbles of various sizes and eight chert objects (20255.x1, 20255.x2, 20255.x7, 20255.x14, 20255.x22, see below). The lack of refits between fragments and the variation in raw material types suggests that the deposited fragments come from different grinding tools. In terms of use patterns, no tools had reached a worn-out state (perhaps with the exception of 20255.x23) before they were discarded, and therefore they could have been modified and continued to be used, if needed. This in fact is evident only in one case (20255.x51). There is variation in the surface condition of the stone objects in the cluster: most of the objects show no evidence for burning and only some of the grinding tools are burnt. In some cases the burning is also visible on broken surfaces; this suggests that the tools were burnt after they had been broken, but the fragmentation patterns do not suggest that breakage had resulted from contact with fire. This in tandem with variations in the fracture condition of the broken margins (i.e. both tools with fresh and still sharp edges and tools with heavily worn and rounded broken margins occur together in the cluster), and the lack of refits between grinding tools suggest that the objects come from different primary contexts.

A close look at the objects deposited in this cluster suggests that their deposition is not accidental and this concentration of material has some 'internal logic' to it. The character of the stone objects deposited make clear references to the stages in the life cycle of a grinding tool: raw material in the form of naturally weathered large size cobble (20255.x20) (raw material procurement stage); rough-outs for grinding tools that still retain part of the natural weathered surface, (20255.x24, 20255.x29) (initial production stage); debitage that relates to the production of grinding tools (both initial shaping and modification stages are represented, e.g., 20255.x8, 20255.x16); tools with use-faces that were pecked prior to use, e.g., 20255.x32, and a complete tool (spherical grinder) that shows all-over pecking (20255.x25) (production stage); numerous examples of tools with one or two-opposed use faces (e.g., 20255.x4 & 20255.x30) exhibiting different degrees of wear (from light use to heavily used surfaces); these make a clear reference to the grinding activities the tools were used for (consumption stage). References to the maintenance stage in the lifecycle of grinding tools are made by tools with re-pecked use-faces e.g., 20255.x33, while grinder 20255.x51 shows evidence for the re-use of the tool in another grinding activity once the tool broke and before it was deposited; a fragment from a grinding tool with no use-faces surviving (20255.x8) clearly indicates a tool that has reached the end of its use-life as grinding tool and has now entered a state of discard. References to different types of grinding activities are also made by the inclusion of schist palettes and polishers within this cluster of objects. With this in mind, it is interesting to explore further the relationships



between the stone objects and other elements of this cluster, especially see the grinding/abrasive tools in relation to the caprine astragali which exhibit flattened sides. Furthermore, the cluster does not only incorporate different types of objects but raw materials as well. These diverse raw materials were procured from different local and non-local geological sources, and thus carry with them specific associations to particular places in the landscape.

The deliberate character of this deposition is further reinforced by the presence of eight chert objects (20255.x1; 20255.x2; 20255.x7; 20255.x14; 20255.x22) that are interesting in morphological terms; although these are not heavily modified objects (i.e. a few pieces have very coarsely shaped margins by flaking or abrasion, while the rest seem natural), there is a consistency in their shape, all being ovate/triangular in shape, and they look very uniform in character.

*North Area, (20965), Sp.511, midden layer in abandoned building*

This unit was particularly rich in quantity and type of artefacts. This midden layer contained mainly fragments of grinding (23 in total) and abrasive tools (10 in total) among which two complete and two fragments of small sized palettes (20965.x13 and 20965.x17) and one further possible palette fragment. The unit also yielded a fragment of a marble bracelet, a complete disc stone bead (found within flotation sample 10558), a stone ball (20965.x12), several fire-cracked rocks with no wear on their surfaces (ca. 20 in total), and numerous small sized natural pebbles and cobbles. The unit also contained debitage (secondary and tertiary flakes) from the production of andesitic tools. The majority of the flakes come from the Heavy Residue flotation sample 10558. Interestingly 12 flakes come from the same reduction episode and some refit. More refits were found between quern fragments, and between fire-cracked cobbles. The presence of flakes from the working of the same nodule suggest possible in-situ production of andesitic tools; this together with other ground stone refits and in tandem with the character of other materials found within this unit indicates quick accumulation of material and little post-depositional movement. The material from (20965) highlights the fact that middens need not necessarily have been strictly perceived as dumping places, but instead external areas might have been actively used as places where daily activities were conducted.

The character of this midden in Sp.511 differs greatly with the midden excavated in the TPC Area. (30773) and (30774), flagged as priority units during the 2013 season, were very poor in ground stone material, when compared to other midden fills. This picture, which requires further investigation in the coming years, suggests variations in the formation of middens that might relate to temporal patterns of use and/or the nature of activities that led to the accumulation of the midden material in the first place. The study of ground stone material from middens/external areas will be a priority for the 2014 field season.

*South Area, (30615), dirty floor of Sp.510, B.118, Hodder Level: South.H*

Although poor in artefact quantities, this unit is interesting as it offers an insight into indoor stone-working activities. The unit yielded a fragment of a pink andesite grinder and debitage-found within the flotation sample 10664- from the working of pink andesite (one primary flake, tertiary flakes and debris, 6 pieces in total). All flakes come from the same nodule/tool suggesting that the different stages of the working of pink andesite took place within the interior of the building.



Figure 12.1. Complete marble bracelet from burial F.7127.  
Photography: Jason Quinlan.

In addition to these priorities units, there were several notable finds from this season's excavations in the North Area. The finds were associated with the multiple burial F.7127 within platform F.3694 in B.52, which contained one adult skeleton and four subadults (Excavation Database, Feature Sheet). At the bottom of the fill (30503) a complete marble bracelet (30503.x8) was found (Fig. 12.1). The bracelet has an outer diameter of ca. 64mm, inner diameter of ca. 50mm, is ca. 8mm thick and weighs 19g. It is almost spherical in plan view, but the bracelet does not form a perfect circle and is slightly irregular. The surface is mainly ground and no traces of colour are visible on its surface, which looks a bit weathered and not surviving in a pristine condition. Overall, in terms of quality of working, this is not the finest example of bracelets found so far at Çatalhöyük: the lack of regularity in the form, the uneven thickness, the rough finish of the

bracelet surface (with manufacturing wear still visible on the surface) all suggest a lack of attention to detail or even lack of technical skill especially when compared to other examples [e.g. bracelet fragment from midden (20965) in Sp.511 or bracelet fragments (19486.x2, 19486.x5, 19486.x2) found in the midden in Sp.489, all exhibiting well polished surfaces and are of very regular form]. The bracelet was not found in direct association with any of the skeletons; its small diameter, however, cannot be taken as a direct indicator about the age of the user, since the same bracelet could have been worn from a young age until well into adulthood (Ifantidis 2011: 128).

Another interesting stone find from this unit was a pendant (30503.k1) made of a mineral with a very distinctive metallic and shiny appearance (possible galena but the exact identification is still pending) which has perfect cleavage. Its overall dimensions are 18.6x14.4x2.4mm and it weighs less than 1g. A perforation (1.48mm in diameter) was located at the narrow end of the pendant; the area around the perforation has lost its shiny appearance and instead looks very rough suggesting that a material of rough texture was used during the drilling of the perforation. The perforation is off-centre and it looks that during drilling a layer of the material came off accidentally. A series of successive triangles have been formed on this face, which take advantage of the natural structure of the mineral, creating an interesting visual pattern.

### **Study of backlog ground stone material from the 2009-2012 excavation seasons.**

In addition to the material from the 2013 excavation season, the team devoted considerable time in the study and detailed recording of backlog material from the 2009-2012 field seasons. To speed up

the recording of the material, in 2013 Level 1 recording was introduced. Level 1 assessment records basic information about the material including contextual data, raw material type, rock size category, object type, weight, size category. In total, we carried out Level 1 assessment for material from 89 units including material from 59 heavy residue samples (ca. 636 objects) from the 2009-2012 excavations in the South Area of the East Mound, and all the information was entered on the Level 1 database.

Material from 40 units (ca. 152 objects) were included in the Level 2 database; this involves detailed recording of material in terms of metrics, raw material use, technological characteristics, manufacturing techniques, use wear, fragmentation patterns and contextual information. The recording system introduced during this field season builds upon the previous recording system followed by K. Wright (Wright 2013), but with some changes. Among the new attributes introduced are: number and location of use faces, fragmentation (recording four states: old, new, both, not applicable), fracture condition (recording the degree of wear seen on broken surfaces: sharp, fresh-looking edges; worn, rounded, abraded edges), shape of use face, percentage of naturally weathered surfaces visible on object surfaces, manufacturing wear [recorded separately for the body, margins, and ends (or bit and butt if it is an axe)], degree of wear for both primary and secondary use faces (none, light, moderate, heavy, worn out, indeterminate), macroscopic use wear on all use-faces, degree of polish (not applicable, not well polished, well polished, highly polished, indeterminate); modification/maintenance of use face.

The analysis of the material from Buildings 76, 79, 80, 96, 89 in the South Area is now completed. B.76, B.79, and B.80, attributed to Hodder Level. South.O, seem to have been contemporaneous structures that were destroyed by fire during one single event (Eddisford 2009: 20, Archive report 2009). The results of the comparative analysis of the material from these buildings will be presented elsewhere, but preliminary observations suggest variations in assemblage composition between these three buildings. Briefly, B.76 was rather poor in quantity of objects with 19 objects in total deriving from the whole building sequence. Apart from three complete flakes, the only other complete object found in this building is an andesitic ovate grinder that comes from the fill (18421) of the post-retrieval pit (18428). This contrasts greatly to the situation encountered in B.79, a heavily burnt building where 'much of the material filling the building appears to have been deposited during this burning event' (Eddisford 2009: 19, Archive report 2009). The building contained a wider range of formal tools among which a complete grinding slab (18545.x2), three complete or almost complete grinders (18595.x1, 18595.x2, 18595.x3) and a complete marble polishing tool (18592.x4). Another complete burnt grinder (18596.x1) was found together with a concentration of dehusked glume wheat grain that was associated with bin F. 5031. Overall, B.79 contained a larger number of complete objects (44.8% of the assemblage) than B.76 (21.1%). Qualitative and quantitative variations in the ground stone sub-assemblages from these buildings could shed light on abandonment practices and closure events, as well as inform discussions about the accidental or intentional nature of the fire that destroyed all three buildings. Furthermore, the analysis of the material from B.76, B.79 and B.80 could inform wider discussions about how different sets of practices materialised on the level of the neighbourhood moving beyond the individual household/building as the unit of analysis.

## Research projects

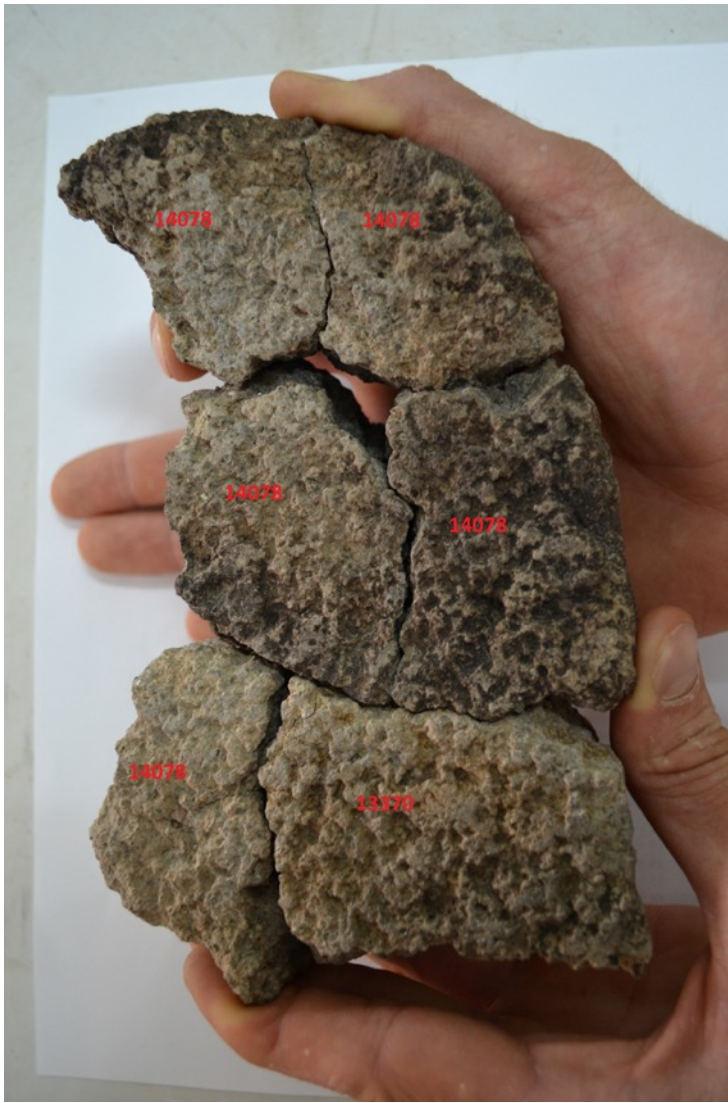


Figure 12.2. Refitted grinding tool from clusters (13370) and (14078).  
Photography: Andja Petrovic.

During this season a research project was initiated that aims to understand acts of intentional deposition and destruction of objects as seen through the analysis of material deposited in clusters. The category of 'clusters' is one of the excavation categories employed by the Hodder excavation teams, and refers to a group of artefacts or ecofacts found together in a deposit (Farid & Hodder 2013: 35). Different types of clusters have been identified that cover a wide range of practices such as clusters linked to early construction events, placed deposits between walls or clusters associated with closure events and abandonment rituals. The aim is to understand the underlying principles that guide the selection of materials and object types to be deposited within the different types of clusters and the condition in which the material is deposited (complete, fragmented, burnt etc), and to elucidate the associations between the ground stone and other materials that make up the different clusters. The main question to address is whether clusters linked to particular rituals/practices (foundation deposit, closure events etc) incorporated distinct sets of materials/objects. For the

purposes of this study, material excavated prior to the 2009 field season and material from the current phase of the Hodder excavations will be considered together. During 2013, in addition to the cluster from Sp.494 in the TPC area (see above), a study of clusters of ground stone objects from the B.65-B.56-B.44-B.10 sequence in the South Area was undertaken. In total, material from 10 clusters was assessed. This study focused mainly on the type of objects represented in the clusters (e.g., querns, abrading tools, axes, unworked nodules) and the activities that are referenced, the nature of the raw materials, the degree of wear exhibited on the tool surfaces (unused, lightly used, heavily used, worn out), and the fragmentation patterns encountered in order to assess depositional practices and the deliberate destruction of objects prior to their deposition. A refitting study of this material was undertaken as well. Through the refitting study it became apparent that some clusters were made up of fragments that do not refit and originally came from different tools with different use histories and other clusters [e.g., cluster (14078)] contained fragments from the same grinding tools. One of the interesting results of the refitting study was that a fragment from a

grinding tool found in cluster (13370) in Sp.299 (outside area) of B.65 refits with fragments of a grinding tool from cluster (14078), which is a stone packing layer within oven F. 2090 in B.65, and form a small quern (Fig. 12.2). The analysis of the data is still work in progress, but initial observations suggest variations between different clusters both in terms of objects represented and the fragmentation patterns encountered.

Finally, a project focusing on the detailed technological and contextual study of all stone axes and related debitage from both Mellaart's and Hodder's excavations was initiated. It is expected that this study will be completed during the 2014 field season.

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### 13. West Mound Ground Stone, 2013

Jacob Brady, State University New York at Buffalo

The primary goal of the laboratory analysis of the West Mound ground stone tools in 2013 was to intensively record tools that were involved in grinding activities. Due to the size of the stone tool sample, a subsample of tools was selected based on fragment size. Most of the pieces larger than 5-10 cm were studied, though a cursory analysis of the smaller fragments suggests that they were mostly end life fractures with no further use of the piece after fracture. The recording focused on form, wear patterns, manufactured elements, visible residues, and raw material identification. The results of the formal analysis have yielded some new working hypotheses. Several types of grinding tools have been identified based on form, use wear, and raw material. Grinding handstones are determinably one handed, apparently manufactured into their current form by splitting a larger tool, ostensibly a two-handed handstone, resulting in two roughly equal halves. This is presumed from the exterior curve of the tools and the wear on the fractures. If the West Mound grinding handstones are made by splitting a larger piece, that begs the question of whether the piece(s) were made as a two-handed handstone and used that way until split, made on the West Mound specifically to be split into two tools, or made and used earlier on the East Mound and recovered by the inhabitants of the West Mound and shaped to meet their needs.



Figure 13.1. Handstone examples

It is this final conclusion that is the most intriguing, since the one-handed handstones from the West Mound are similar in form and raw material to the two-handed handstones from the East Mound. Given that stone tools are incredibly durable and would be completely usable after thousands of years and the immediate availability of otherwise laboriously acquired and manufactured tools on the East Mound, the inhabitants of the West Mound may very well have been salvaging stone tools from the East, a place they likely had memories, stories, and ancestral links to. If so, did the act of

retrieving and using stone tools from the 'old town' have a significant meaning for the people; was it distinct from the meaning attached to tools manufactured at the present?

Two other new types deserve mention. The first is a large, hexagonal two-sided mortar. Two examples were recorded; the first example, 15165.x1, made of porphyritic andesite, appeared to have been used extensively, with the mortar depressions (4-5 cm deep) nearly connecting (which would have formed a hole). The depressions are quite pointed; since no pestles have been found narrow enough to fit such a depression, it is likely wood or other soft-material pestles was used with it. The other example, 17214.x4, is a serpentinized basalt hexagonal two-sided mortar, though with very shallow depressions, apparently in the process of being manufactured or only lightly used. Both the form and the wear patterns are similar to 15165.x1, though the extent of the wear and the raw material differ.

The other noteworthy type is a combination shallow-mortar and grinding slab. A few examples of this type were recoded (15196.x6, 15343.x8, 17213.x1, 15227.x1); all of them included a broad, shallow depression surrounded by a grinding surface. This is interesting in that it correlates well with recent findings from our archaeobotanical laboratory that confirm the presence of hulled barley (West Mound Archaeobotany, Ch.10). Hulled barley requires a two-step processing in which it is lightly crushed then rolled (lightly ground) to remove the husks without grinding the grain to flour (Stroud, personal communication 8/2013). A common use for hulled barley grains, rather than flour, is malt for beer, so this light processing of the grains may provide supporting evidence for the treatment of barley for brewing. The whole grain is also commonly used as feed for livestock today, and so may have been in the past, as well as being used as food by the people of the West Mound.

A number of the tools had manufactured ergonomic or comfort features, including palm rests, finger grips, and possibly handedness. These features are quite clearly the result of manufacturing and not just the result of wear contact with the users' hands. One tool, 16898.x8, found in Trench 5 in 2008, is an ergonomically well designed tool. This tool has a main grinding face, with red pigment residues on the use face, and pounding wear on the proximal end. The tool, when held in the right hand, has a palm rest made by removing large flakes from the palm-side and four distinct finger grips, with the inner two fingers sharing a grip. The palm rest is well worn, with chemical alteration



Figure 13.2. Ergonomic hand tool with pigment



Figure 13.3. Multi-tool

(likely from oils on the hands of the users) on the top ridge. The finger grips were made by light chipping and also show heavy chemical alteration. The directional shift in density of the pigment on the use face and the location of the pounding wear also support the manner of holding the tool.

In addition to the visual observation of the sample, I also made observations with a handheld X-ray Fluorescence Spectrometer. This analysis was designed to augment the visual analysis of grinding tools, so the study sample was composed of the variety of andesites (which are by far the most common rock for grinding tools) and a few basalts in order to establish a baseline for the determination of the type of rock. The sample included 45 pieces, with five points recorded on each piece. Each point was recorded for 90 seconds, in order to increase the number of points so that an average for each rock could be determined. The goal of the XRF analysis is to sub-type the andesite in order to check for correlations in rock types with tool types. One of the problems with andesite, and other phaneritic or porphyritic igneous rocks, is the heterogeneity of the crystalline structure of the rocks. This is why I have elected to record more points at lower resolution, which can be manipulated to account for potential outliers. Future analysis will expand the data set to include potential source rocks, but the current data set is exclusively composed of the West Mound sample.

Many new stone tools were excavated during the 2013 field season; two of which are particularly noteworthy. One, 31210.x1, is the largest grinding slab to have been found so far on the West Mound. 31210.x1 is 54 cm long and 18 cm wide at the widest point and is made of grey porphyritic andesite. This tool was found in B. 105 (Sp. 342) with one corner resting inside of an internal, constructed mudbrick feature (Unit 18372). According to the pattern of the use wear, the curve of the use face, and the pattern of chipping along the edges, the slab had been used in the location and position that it was found in. This would make 31210.x1 and its associated units and materials the first *in situ* grinding activity area found on the West Mound. The soil surrounding the slab was well sampled for flotation so that seeds and other botanical remains can be recovered. Some plant remains were noticed in the soil during excavation, especially what appears to be hackberry. The slab was subjected to heavy alteration, involving chipping of the edges (causing rounding) and thinning of the tool's width (on one half). These alterations resulted in reduced usable surface area and it is currently unclear what the purpose of it was.



Figure 13.4. Big slab





Figure 13.5. Holey Mortar.

The other exceptional find from the 2013 season also comes from Sp. 342 in B. 105 and is a large, deep mortar with a hole in the depression (31238.x1). The bottom of the tool has heavy chipping around the hole, indicating clear intentionality in its manufacture, and what may be a small, chipped channel running from the hole to the exterior edge. If the hole was intentional, then what use would a mortar with a hole in it be? The apparently obvious reason for a hole would be to allow something to fall or flow through it. If the hole were covered with a piece of fabric, or some other semi-permeable membrane, then it could allow liquids to exit the hole while retaining more substantive materials. So, this mortar may have been used to extract water, juice, oil, or some other liquid from plant or animal materials.

The 2013 ground stone analysis yielded many interesting conclusions and new hypotheses, suggesting potentially productive avenues of inquiry for future research. The XRF analysis of igneous rocks will continue with the goal of expanding the sample to include basalts and diorites and potential source locations. The visual analysis will continue and be expanded to include other classes of tools, such as abrasive tools, pounding tools, polishing tools, and axes. Residue and pigment analysis, which was begun in 2013, will be greatly expanded to include XRF analysis of pigments on the ground stone, pottery, and plaster in order to illuminate the relationship of these pigments. Non-visible residues, particularly starches, are envisioned for future analysis as well. The 2013 research season was productive in both providing new answers and new questions about the stone tools of the West Mound of Çatalhöyük.

## 14. East Mound Pottery, 2013

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### Database Work

In 2012, the Neolithic Çatalhöyük pottery was categorized in detail by ware groups by the pottery lab. In 2013, the material in question was discussed according to their surface treatments, firing conditions and typology. Thus we have determined the features to further analyze and register in the database. The previous studies yielded a very detailed form to record the body sherds in the database. However, we realized that recording on these forms consume a lot of time and what is more it was only the ware groups we look at for the body shers. That is why, the criteria for recording the body sherds in the current database were changed and simplified. In addition to these, with the TPC area excavations the number of post-Neolithic material started accumulating in large amounts. Thus, we came up with a separate form to record and evaluate specifically the TPC area pottery. The meetings with the database developers yielded a new database which meets the lab's requirements. The form we have designed worked on the new database system and as the records were entered into the database, the malfunctioning aspects of the database were determined and fixed.

### Form Catalogue Posters and Display



Figure 14.1 The categorial display of the East Mound Pottery

The examples of all the pottery drawn and illustrated by specialists in the pottery lab have been drawn to their exact scale dimension and scanned. The scans have been grouped under the newly designated categories and each are placed within its new category. Thus we have come up with a catalogue of the pottery of the Neolithic Çatalhöyük period.

The typology categorization we have developed consists of main groups based on their functions. For the new typology categorization, we have prepared large scale posters for display. The posters below help us to both define the typology of the pottery and register them on the database. The posters also represent an example instructive material both for the students and the specialists who are interested in pottery.

We have also put on display a small group of pottery with original pieces which represents examples of the newly defined form categories and the last year's ware categorizations. In this display all the categories were depicted with an example. The display functioned as an instructive tool in demonstrating Çatalhöyük Neolithic pottery tradition.



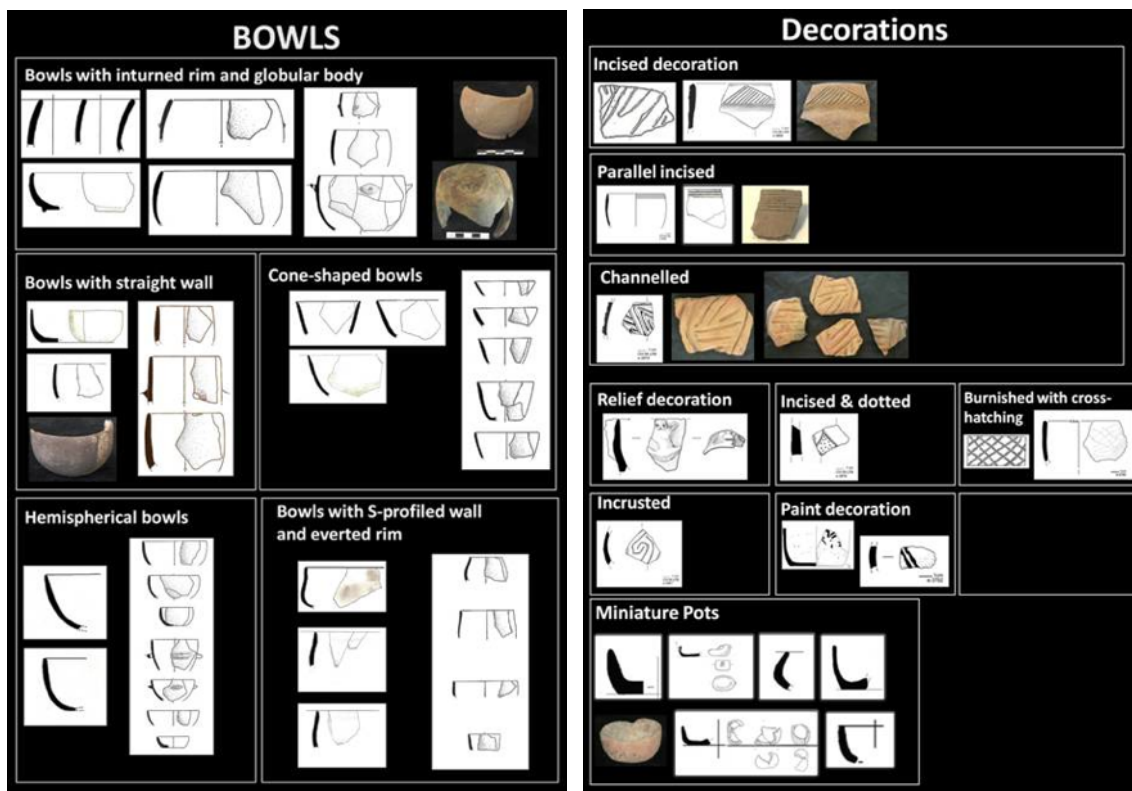


Figure 14.2. Typology characterization.

### Various Analyses

The first year member of the pottery team, Marta Bartkowiak – who is currently doing her PhD on the lipid analysis of the pottery tradition in North West Anatolian Neolithic sites – carried out her lipid analysis research on the ceramics excavated from the TP area between 2000-2011. TP excavations have aimed at shedding light into understanding the sequences of the upper levels in the Neolithic Çatalhöyük. 150 ceramic pieces were picked out of safe units of the upper levels for analysis which correspond to Mellaart’s Level III-0. These levels according to the new stratigraphical levelling terminology in Ian Hodder’s new excavation period match with TP.M, TP.N, TP.O, TP.P, TP.Q, TP.R and TP.S. They are from seven different stratigraphical levels. The project and the pottery lab will benefit from this research with its outcome in determining the functions and the areas of utilization of the ceramics in the later phases of the Çatalhöyük’s Neolithic ceramics tradition.

The 150 sherds were all selected out of very clear pottery samples of the body close to the rims and lugs. These samples have been largely drawn, and their typology have been recorded in our database. The samples have been photographed. The samples will be returned back to the site in 2014 season. And, the analysis will be done with the extracts from a small drill on the pieces. The remaining small number of the samples will be drawn and recorded in 2014. The results of the analysis will be available later in 2014.

This year, to evaluate the firing techniques of the Neolithic pottery, we have chosen 6 samples. These samples have been exported to METU for Standard XRD and XRF analysis, and to UC Berkeley University for TEM, micro-diffraction and crystallography, micro-XRF, SEM and micro-tomography analysis. Çağla Meral will be working on these exports.

### Restoration:



The pottery examples which were reassembled in the past but have had restoration problems and those reassembled basically for certain analysis have been conserved and restored this year again. These pottery samples had been in display during the season and were sent to the museum by the end of the season.

Figure 14.3. Restored vessel examples sent to the Archeology Museum of Konya

### General Evaluation

In 2013, the pottery samples from 887 units, which have been excavated between 2009-2013 have been analyzed. The most significant aspect of the analysis was recording the typology of these materials in the database. Some of the pottery pieces left unregistered last year were accounted on an excel sheet due to the inability to connect to the last year's server or the old database. These records on the excel sheets have been reevaluated within the framework of our lab's new categorizations and started to be registered on the new database this summer. What we have not been able to achieve this summer but will put emphasis on completing is the drawing and photographing of the each diagnostic pieces.

This year the work has concentrated on the 377 units that came from the TPC area since 2012. The material comprises of Islamic era, Roman-Byzantine period, Classical Period, Hellenistic Period, Iron Age, Bronze Age, Chalcolithic and Neolithic Periods. These sherds have been divided by their periods first and then were registered on the database after their weighing. This was followed by the detailed analysis of the Neolithic period pottery samples.

The South and North areas yielded very small number of pottery samples. Similar to 2012, in TPC area the upper level units have been excavated which produced many heterogeneous materials. Besides, the units in the TPC area bear pottery examples that are similar to the Early Chalcolithic pottery of the West Mound. These examples were found in mixture with Neolithic, Bronze and Iron Age pottery examples. They haven't been yet related to a stratigraphical level or a specific

architecture structure. Examples of large pottery types from Chalcolithic Period resembling to pithos were unearthed. Whether these point to a settlement level contemporary to the West Mound's Chalcolithic one will be understood with the further excavations in the area.

This year within the materials that came from the TPC area, we have found unusual pottery examples which we have not come across before. Below are these examples:

### 30866.S1



Figure 14.4. 30866.s1. Height 40cm (without base), width 31cm, diameter 24cm.

We have reassembled half of a cooking pot with the material from TPC area. This pot is the biggest pot we have so far unearthed. Before this, the 2004 find, unit no 10044, from North Area was regarded the biggest.

Although the bottom of this vessel has not been found, it is definitely higher than the unit 10044.S2 pot by 11 cm. Like 10044.S2 vessel, this one also has a lug close to its rim. The lug only has an impression on the photograph. The lug has a hole on. Of the pieces we haven't been able to reassemble, there is part with a lug attached. The width of the lug is 14 cm making it the widest lug ever found at Catalhoyuk. Moreover, the form of the lug found in these kind of pottery examples should be named a handle.

This vessel was found in unit 30866 in TPC area within a mixed context of different periods materials. However, the rim of the vessel in a style called S profile – a characteristic of the upper levels – and the typology of this vessel locates the vessel at a later level either after South S. or after Mell III.

### Unit (20703) Oval Vessel



This year, again in TPC area an oval vessel with a decoration on has been unearthed. This vessel has decorations on which

Figure 14.5. Oval vessel from unit (20703). Photography: Ingmar Franz

resemble to bull horns along with a basket handle reminding of the facepot vessel found in 2006.

This vessel was found in small broken pieces. The colour of the vessel points to the fact that it had been broken prior to the collapse of the building and was spread around in the building. This is because parts of the vessel were burned in a fire and the remaining parts resumed their original colour.

Another issue to be emphasized about this vessel is that it is different than the other vessels with legs. The below photo depicts a typical Çatalhöyük vessel. The photo on the left shows, unit 20703, the vessel with square shaped legs.



Figure 14.6. Oval vessel from unit (20703). Photography: Ingmar Franz

### **2014 Plans:**

The previously unrecorded data from TP area between 2000-2011 will be analyzed and recorded on the database.

The first report of the TP lipid analysis will be done and the exports will return to the site.

The pottery tradition of the late levels of the Neolithic East Catalhoyuk and possibly of the earliest levels which have been recently started to be excavated will be better understood and interpreted with the continuing excavations focus on these areas.



## 15. West Mound Pottery, 2013

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### Processed pottery 2013

This season more than 250 kg of pottery, mostly from 2012, were sorted, counted and weighed. So far more than 1,200 kg of pottery from Trenches 5-7 (2006-2012 material) were processed in this way. These masses of material consist of more than 655 kg of undiagnostic pottery (56,063 sherds) and over 599 kg of diagnostic pottery (14,452 sherds).

### Defined Vessels



The search for vessel profiles in the Trench 5 material continued. We were able to define 12 new "normal-sized" vessels from the 2012 and 2013 pottery, of which one is a basket-handled vessel and eleven vessels are different shaped bowls (V191 - V199, V201, V202, V209) (Fig 15.1). The bowls comprise five ellipsoid painted carinated bowls with S-profile and ring bases (V191, V195, V196, V199, V209), an unpainted ellipsoid bowl with S-profile (V202), four painted ellipsoid bowls with different C-profiles (V192, V193, V194, V201), and a painted ellipsoid bowl with C-profile and vertical handles (V197).

Figure 15.1. Defined vessels within Trench 5 in 2013

Beside these "normal" vessels also six different shaped miniature vessels were registered, of which one even has a fitting lid (V200, V203 - V208) (Fig 15.2). Striking is that the miniature vessels represent typical "normal-sized" vessels, like unpainted and painted bowls (V203, V204), necked jars (V208), basket-handled vessels (V207), cooking pots (V205), and flat bowls with ring bases (V200). The miniature vessel V206 is in fact a lid, which perfectly fits to the miniature bowl V203.





Figure 15.2. The miniature vessels of West Mound, Trench 5 in 2013.



Figure 15.3. Basket handled vessel, vessel 198.

Vessel 198 is the most complete painted basket-handled vessel from Trench 5 so far, which nicely shows the shape of such containers. This vessel type is one of the missing links connecting the East Mound pottery assemblage with such from the West Mound, as basket-handled vessels were already made by the people during the East Mound occupation (Fig. 15.3; also Duygu Tarkan this Archive Report).

Additionally, this season also nine vessels from the East Mound were given a vessel number to facilitate future comparisons with the West Mound pottery (V210 to V218). They comprise five different-sized cooking pots (so-called "hole-mouth jars"), two ellipsoid basket-handled vessels, an ellipsoid bowl with C-profile and vertical perforated lugs, and a small rectangular bowl with a relocated rim for holding a lid (Fig. 15.3; also see East Mound Pottery, Ch. 14).



Figure 15.4. East Mound vessels registered in 2013

### Unfired pottery and badly fired pottery



Figure 15.5. Unfired and badly fired pottery from Building 107, Unit 31101 in Trench 5 and for comparison pieces of badly fired pottery from Building 105, Unit 18346. Additionally, the first probable pieces of unfired pottery from Unit 30221 and Unit 30756 of the TPC-Area.

In Building 107 in Unit 31101 a massive cluster of unfired pottery and some pieces of badly fired pottery were discovered this year. This is the largest cluster of unfired pottery excavated in Trench 5 so far. It consists of fragments of different vessels, which was shown by carefully cleaning, sorting and refitting of sherds. Some impressive clusters of sherds were consolidated by conservator Ashley Lingle as they still were in the room fill. In this way we were able to preserve some of the original stacking of broken vessels parts, to illustrate how they were laying on top of each other in the room fill (Fig. 15.5, a-e). The pieces of badly fired pottery are the second example of such kind of finds, as we found similar sherds in Unit 18346 in Building 105 (Fig. 15.5, f & g). Surprisingly, this season the first probable pieces of unfired pottery from the East Mound were recognized between the clay objects from Unit 30221 and Unit 30756 of the TPC-Area. They all show a flat slightly curved shape resembling fired pottery sherds. The piece from Unit 30221 even shows layers of clay, as they were folded or pressed

together. Interestingly these pieces seem to be examples of two different fabrics: the ones from Unit 30756 show a fine grained charcoal tempered clay, and the one from Unit 30221 shows a coarser grained mineral tempered clay (Fig. 15.5, h & i; see Duygu Tarkan this Archive Report).

### Sherd tools and sherds with basket impressions



Figure 15.6. Sherd tools and sherds with basket impressions.

To continue the data collection on the evidences of pottery manufacture 12 new sherd tools and four sherds with basket impressions were registered. As the tools show different shapes and sizes it is obvious that they were used in different ways. How they were possibly used will be subject of future analyses. The basket impressions will also be studied in detail to tell something about the possible basket moulds which were used to make the pottery (Fig. 15.6).

### Clay objects

Out of the clay objects from Trench 5 and the TPC-Area suspicious objects were registered, which could be related to pottery manufacture. First of all, several remains which prove object-shaping with clay, like burned clay slaps, burned squeezed clay, and pieces of burned clay coils. Beside their distinctive shape also the visible fingerprints were important for recognition. Fortunately we also could register different sized and shaped balls of rolled raw materials like clay and marl, which highly resemble the unfired clay balls found in Trench 5, especially from Building 98, Space 449 (see Franz 2011). A new kind of object was registered in form of a fired clay dice with used edges and surfaces, which is the first burnishing tool of this kind.



### Figurative representations

A zoomorphic spout was found by Sophie Violet Moore and her team on the western slope of the West Mound in area 027-41 of their survey around Çatalhöyük. With this survey they were looking for probable settlements related to the ancient graveyards on the mounds of Çatalhöyük (Fig. 6, 027-41-S.1; see Sophie Violet Moore this Archive Report). The other six objects were excavated during the last seasons in Trench 5 and 7, but were not presented yet. Only one piece shows a part of a painted human representation on a base sherd of an open bowl (Fig. 6, 15104). Four fragments show zoomorphic shapes, as one is a very naturalistic-looking small cattle head application on the outside of a former small vessel (Fig. 6, 18314), and three of them are handles of duck-shaped bowls or spoons (Fig. 6, 14212, 15121/S.3, 16870). Such kind of vessel was found in 2011 in Building 106, Unit 16967 (see Franz Archive Report 2011). The fragment from Unit 15100 in Trench 7 shows itself not really a figurative representation, but most likely it is a foot or leg of an zoomorphic or anthropomorphic vessel (Fig. 6, 15100).

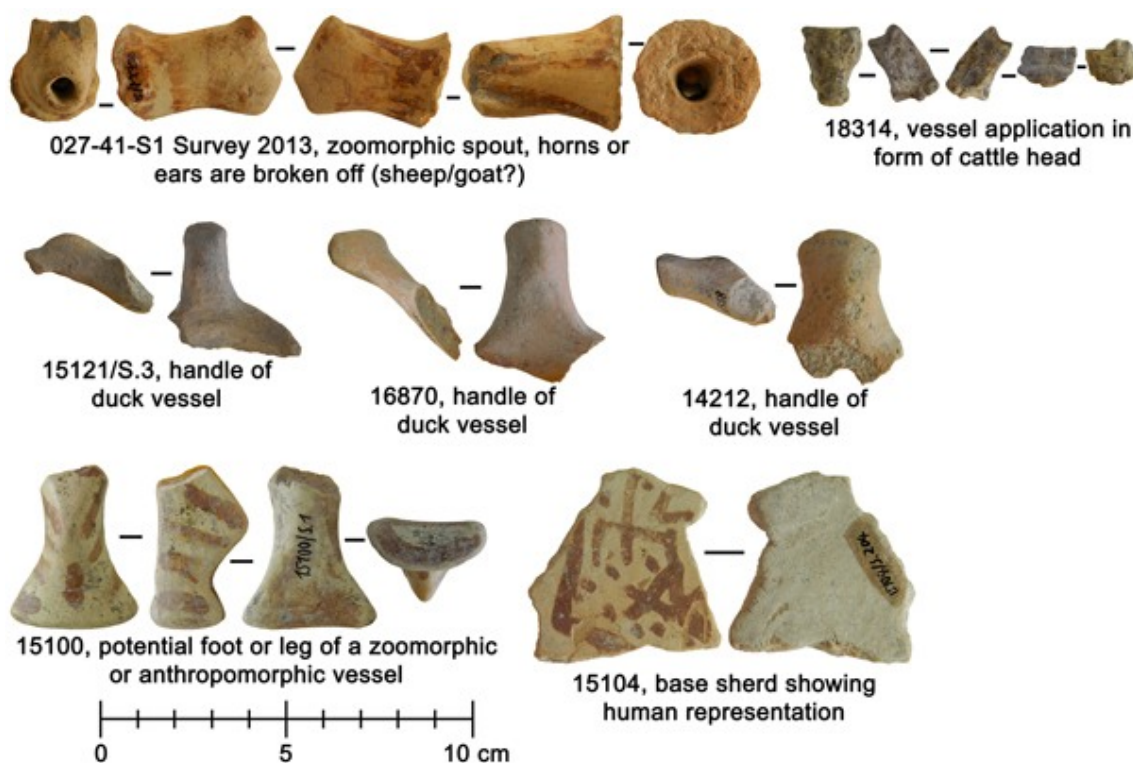


Figure 15.7. Figurative representations, West Mound Pottery, 2013

The representations on the small necked jar Vessel 187, found in Building 107, Unit 16988 in 2012, were intensively studied, to reconstruct the probable scenes depicted on it.

### **Sherds with deposits**

Finally, beside all the pottery manufacturing evidences shown above, also some good examples of sherds showing thick conspicuous deposits are presented. They provide good information about the way some pottery vessels were used by people at the time the Çatalhöyük West Mound settlement was occupied. The sherd covered with red pigment from Unit 15165 in Building 106, shows that red pigment was processed or stored in pottery vessels. The sherds covered with a thick yellow-whiteish deposit show that, either calcareous water was boiled repeatedly in them, or calcareous materials were processed or stored in them. One sherd is covered in a very rough and hard, mixed deposit. This kind of deposit was not observed yet and will therefore be studied in detail in the future.

### **Acknowledgements**

I want to thank the West Mound Team for helping processing the masses of pottery and Duygu Tarkan for her discussions about pottery technology at Çatalhöyük.

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## 16. Conservation

### Ashley Lingle, Çatalhöyük Research Project

The 2013 season brought about many changes for the conservation program at Çatalhöyük. This year site and artifact conservation was carried out in collaboration with the conservation students from Cardiff University, Institute of Archaeology-UCL, and Selçuk University. The focus of the season was to study the previously tested sustainable conservation treatments of the buildings and use that information to improve and expand the work being done to preserve the site.



Figure 16.1. Conservation Team Block Lifting a Bucranium Installation from Building 52

### Conservation and Maintenance of the North Shelter

Across the site this year, under the advisement of Conservator Chris Cleere, modifications were made to the treatments carried out on the Buildings at Çatalhöyük. It was agreed that the grouting method, previously designed by Frank Matero, and carried out at the site over the years (see 2009 Archive Report), needed to be phased out. A new system was devised using perlite (amorphous volcanic glass) and Paraloid B-72 (Ethyl methacrylate copolymer) in acetone. The decision to use this new system was based off Mr. Cleere's previous successes with the material at Chedworth Roman Villa in the United Kingdom, a need to create a less visually abrupt fill, and most importantly a fill that would last longer. During the season the fill proved to be more successful than the previous treatments, a more comprehensive assessment will be carried out next season.

Conservation and maintenance was undertaken in buildings both with on going excavation as well as on open display. Buildings 5 and 119 required the most maintenance. Building 5 has an ongoing problem with moisture and salts (see Archive Report 2010), in an attempt to further understand these agents of decay samples were taken for SEM analysis to be completed at Cardiff University. Building 119, however was a newly excavated building this year, and suffered from rapid desiccation. Building 119 was treated to its full extent during the 2013 season, and then covered with geo-textile and partial backfilled for the off-season. Other buildings in the North Shelter had

sacking added where needed for support, and spoil removed which had accumulated over the off-season.

Based on the recommendations of Chris Cleere, several modifications were made to the exterior of the North Shelter. The intended outcome of these modifications was to help create a more stable environment within the shelter and to mitigate water runoff in the winter. To impede water runoff during the winter additional flapping material was run along the west side of the shelter from the lowest inter wood beam to the exterior, this blanketed the surrounding ground and was covered in several centimeters of earth. The openings in the shelter at the north end were filled with insulation and plywood, allowing less airflow through the shelter will facilitate the microclimate in stabilizing, in turn causing fewer problems with moisture and salt efflorescence. Further assessments will be made in the 2014 season to gauge the success of these modifications as well as the need for any further modifications.

### **Expansion of the Experimental Capping Project**

During the 2010 season an experimental capping project was undertaken in Building 5 (see 2010 Archive Report). The cappings were done initially with marl to mimic the original Neolithic plaster, this was repeated in the 2011 season (see 2011 Archive Report). In the 2012 season, the decision was made to try an alternative capping program with a lime wash barrier between the original mud surface and a new mud wash (see 2012 Archive Report). The intent of this lime mud combination was to create a sturdier barrier, in need of less maintenance and with an obvious visual barrier between original and new material. In the 2013 season this methodology was reassessed. The cappings had degraded over the year at an unacceptable rate, however the loss occurred uniformly at the lime layer. This suggests that the erosion of the walls of Building 5 is occurring due to internal as opposed to external factors. To address internal problems a capping more porous than the original mud brick needed to be devised. Given the limited amount of time the conservation team has to devise, test, and assess the cappings; rather than test one material/methodology several were tested this season.



Figure 16.2. Cappings at the Beginning of the 2013 Season

The mud wash from the 2012 season where the lime did not come away was still in good condition. This mixture of excavated spoil, chaff, and water (see 2012 Archive Report) was used as a control for the further experiments. To begin with test bricks were made with the following materials and

proportions: 30% chaff/ 35% mud/ 35% cotton, 30% chaff/ 35% mud/ 35% wool, 30% chaff/ 35% mud/ 35% medium perlite, 50% chaff/ 35% mud/ 35% medium perlite, and 30% chaff/ 35% mud/ 35% large perlite. The bricks were all made with the same dimensions. Once dried the perlite bricks were the lightest, while the cotton brick was most visibly porous. Cotton and wool were selected for this experiment as they are readily available in the area, and could have acted as more socially acceptable replacement to human or horse hair which are commonly used in mud brick fabrication. The next phase of testing was the application method. Initially, a thrown or “splatter” method was used in an effort to limit alignment of the silicates in the clay to allow for the maximum porosity. While this method initially proved to have good contact, once dried the capping became unstable; additionally this method was aesthetically displeasing. The splatter method resulted in a capping approx 3 cm thick. The second application method was a “smear,” where in the materials were mixed to a more aqueous consistency and then gently rubbed on the wall to ensure contact. This method was very successful it was easy to apply, aesthetically pleasing, and did not cause the mixture to separate; the capping was less than 1 cm thick. The third application method was a wash; this mixture was the most aqueous and was applied to the wall with a rag. More than one coat was needed for application, additionally the additional water caused the chaff to separate from the mixture somewhat, making application difficult; the wash method resulted in a capping approximately .5 cm thick.



Figure 16.3. Capping tests.

Drying also proved to be an important component to the capping procedure. One set of cappings was allowed to air dry in Building 5, while the others were covered. One wall was covered with a damp cotton sheet, while the other was covered with a sheet of SympaTex (waterproof fabric with a breathable membrane). The coverings were lightly weighted while drying with sandbags. The SympaTex was the most successful, after trial in other areas though similar results could be achieved with the damp cloth if it was monitored and dampened twice a day. The addition of the sandbags helped

to ensure good contact to the original mud brick as well. The capping allowed to air dry had structural cracks to the original material within a day, while the covered cappings had nothing more than fine superficial cracks.

At the end of the season the conservation team had come to the following conclusions regarding the capping experiments: first, that the cotton and wool did not have the desired characteristics and tended to clump. Secondly, the splatter and wash methods were less practically ideal to the smear method. The medium perlite was less visually obvious once the capping was dry, however, the large perlite is more likely to perform in the desired manner, drawing moisture and salt away from the way and passing through the new mud material causing it to preferentially deteriorate.





Figure 16.4. Capping experiments at the end of the 2013 season.

As part of the capping program, the conservation team decided that it needed to expand its testing area outside of Building 5 to get a better understanding of how the cappings could potentially perform in other areas of the site. For this reason Building 4 in the South Shelter was also selected for cappings during the 2013 season. Building 4 is an excellent parallel to Building 5 as it has been on long-term open display and is found in a similar location within the shelter. As the preservation environment is very different in the South Shelter, as well as the mechanics of deterioration affecting the mud brick it is an important next step for the conservation team to compare the behavior of the cappings in the 2014 season.

### South Shelter



Figure 16.5. Conservation Student Uncovering Painted Plaster in Building 96

Buildings under excavation and those on open display were regularly checked and treated by the conservation team as necessary during the 2013 season. The process of replacing some of the old failed fills in the walls with the new perlite mixture also began. Work in building 80 was limited this year, as the Building is now being excavated once again, with an emphasis on the stratigraphic relationships of the plaster layers. After some debate, the decision was made to further consolidate the wall painting F. 5014 and leave a small section on open display during the offseason to see how it fairs. An additional geometric pattern was discovered in Building 96 at the

start of the 2013 season, but due to time constraints and the active excavation in the building, it was decided to wait till the 2014 season to further expose the painting.

### TPC Trenches

One very exciting find the 2013 season was from the TPC II trench, a new type of geometric pattern in grey and white. The painting was discovered towards the end of the season, and the conservation team worked tirelessly to expose the painting before the close of the season. The pattern was primarily found on the east wall of Building 121, but also occurred on the north and west walls as well. The South wall is currently behind where the trench is sectioned, and only further excavation of the building will reveal if the painting continues. The painting was lightly consolidated with 2.5%

Paraloid B-72 in 50:50 acetone:alcohol and covered in Japanese tissue and geotextile to preserve it in the offseason.



Figure 16.6. Conservation Team Working to Uncover Painted Wall Plaster in Building 121

### **Conservation of Small Finds**

During the 2013 season, work was carried out in the lab on a variety of finds excavated in the field and materials excavated in previous seasons. Conserved materials included horn cores and other animal bones, human bones, pottery, clay figurines, wall paintings, and stone tools. This year the Conservation team along with the Finds team continued the Integrated Pest Management Program set up in 2012 in the storage depots. Traps from 2012 were collected and specimens reviewed. Additionally, new traps were placed in all three depots at the end of the season. The Finds and Conservations teams also undertook a review of the previously conserved faunal material from previous seasons. Objects in need of further conservation were retreated during the 2013 season.

### **Acknowledgements**

Thank you to everyone for all their hard work, making the 2013 season a huge success!



## 17. Heavy Residue Archive Report 2013

Milena Vasić, Freie Universität Berlin

The heavy residue processing started on June 27<sup>th</sup> and ended on August 25<sup>th</sup>, whilst the sorting of the samples ended on August 7<sup>th</sup>. The team comprised five sorters (Ebru Sivaz, Saliha Sivaz, Kezban Sivaz, Kübra Güven, Hatice Çelik and Senay Yasli) who were overseen by Milena Vasić and Jovana Tripković. In addition to sorting, Ebru Sivaz was also responsible for sieving the smaller samples that were processed fully, as well as writing the labels for materials after sorting was completed. As usual, the backlog from 2012 was dealt with first. The first two weeks were dedicated to processing 335 samples from the previous year from the North Area (N=83), South Area (N=113) and TPC (N=170) as well as two samples from the West Mound.

This season, 851 samples were floated. These samples came from 781 units, meaning that there were a number of duplicated samples (see Heavy Residue Archive Report 2012). These samples have been merged and recorded as such in the Heavy Residue Database.

The entirety of soil samples taken this year from the North (N=224) and South Areas (N=178) have been fully processed. Samples from the TPC area have only been partially completed (78 have been fully processed including 28 samples from the designated priority units, whilst 128 have been sieved and left for sorting in 2014). Samples from the West Mound have been stored for 2014. As a result the backlog for the 2014 season comprises 128 samples from the TPC Area and 45 samples from the West Mound.

Unfortunately, the database changes have not happened this year (see Archive Report 2012). However, all the additional information for each material was entered in the 'comments' field. Also, following the previous agreement with the Finds Officer Lisa Guerre, the search for material in the Heavy Residue Database has been simplified by following the data sorted field. All the materials from the backlog have been recorded under 01/07/2013<sup>1</sup>. Two samples from the South Area that were taken in 2011 were recorded under 02/07/2013. All the samples taken in 2013 have been recorded under 01/08/2013 apart from the samples from priority units that were given different dates.

### North Area

This year three buildings (B.52, B.77 and B.102) were excavated in the North Area. As buildings B.77 and B.102 have been tentatively allocated to level North.G to which building B.52 belongs; the samples from the floor deposits of these three buildings have therefore had only a preliminary comparison which will need to be developed further.

As expected, heavy residue samples show that the platforms in these buildings are significantly cleaner than the 'general floor' deposits.

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<sup>1</sup> Note that 33 samples from the TPC Area from 2012 were recorded under 02/07/2013.

The floors of B102 have a significantly higher density of bone than the other two, whilst building B.52 has by far more mollusc and obsidian on the floors. Plant remains are approximately equally distributed among these buildings with building B. 102 having a slightly higher density.

Worked bone is not present in any of the floor deposits of all three buildings, whilst flint was found only in the niche (19098) of building B.77. A fragment of clay ball was found in the sample taken from the south east platform (19293) where the ladder used to be in building B.77. Three other floor deposits in building B.77 contained clay objects (19017, 19507 and 30133) whilst two were found in the floor deposit (30543) of B.102. Pottery fragments were retrieved from one sample (19505) from building B.77 and two samples from building B.102 (30132 and 30554). Furthermore, two stone disc beads were retrieved from the floor deposit (19293) of building B. 77 whilst a stone and clay bead found on the platform in SE corner of the building (19539) both had traces of malachite. Two shell beads were recovered from a patch of floor in the north eastern corner of B.102 whilst another bead made of stone was recovered from another floor deposit (30554) in this building. Heavy residue samples from the floor deposits of Building B.52 did not yield any beads.

When compared to the other buildings in level North.G, building B.102 and B.52 have a significantly higher density of bone, whilst B.77 has a definite lower density of bone than the standard for the level (see Mitrović and Vasić 2013). On the other hand, the density of bone in building B.52 is in keeping with the standard density for the floor deposits in level North.G, whilst buildings B.77 and B.102 had notably lower densities.

### **South Area**

Two buildings (B.80 and B.97) from the level South.O have been excavated this year and these heavy residue samples will be briefly compared in this report with two buildings from the same level that had been excavated in the previous seasons (Buildings B.76 and B.96).

Samples from the floor deposits in building B.97 have a higher diversity of materials (N=6) than the other buildings from this level, however, this might be due to a larger number of samples from this building.

Clay ball fragments were retrieved only from building B.97 (18637, 18697, 19646, 19653 and 19661). Fragments of figurines were collected from two floor deposits in building B.97 (18639 and 20342) and one deposit in building B.80 (18976). Other objects made of clay were also retrieved from these two buildings, one from a floor deposit in B.80 (18976) and three from floor deposits in building B.97 (18679, 19646, 20342). Fragments defined as shaped clay have also been found in the samples from B.97 (18697, 19615 and 19646), as well as three deposits in building B.76 (18476, 18710 and 18759).

Floor deposits of buildings B.76 and B.97 yielded beads made of stone and shell. Four stone beads were found in building B.87 (18417, 18429, 18462 and 18443), whilst 20 beads made of stone and shell were found in the floor deposits of building B.97. A hearth rake out deposit (19604) contained nine complete and two fragmented disc beads.

Flint was recovered from four deposits in building B.76 and four deposits from building B.97, whilst pottery shards were found in three samples from building B.76 and five samples from building B.97. When the densities of five ubiquitous materials from the floor deposits of these four buildings are compared, building B.97 seems significantly richer with obsidian and bone, densities of plant and eggshell are higher in building B.80 whilst mollusc has the highest density in building B.76. Overall, the floors of building B.86 seem to have been the cleanest.

This is just a preliminary overview of the samples from these buildings and an in depth analysis will be conducted in the future.

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## 18. 3D Digging Projects - Season 2013

Maurizio Forte<sup>1</sup>, Nicolo' Dell'Unto<sup>2</sup>, Nicola Lercari<sup>1</sup>

<sup>1</sup>Duke University, <sup>2</sup>Lund University

### Introduction

The excavation season was scheduled from July 6 to August 6, 2013. The goal was the continuation of excavation of the B89, North Shelter, East mound, Sp.379 (Fig.18.1).



Figure 18.1. 3D Model of B.89, 2013.

**Excavation Goals:** excavation of retrieval pits, make up and floors of B89, burials under the platform, recognition of wall paintings, excavation of the “dirty” floor and hearth in the south part of the house, last room infill over the floor; excavation of burials under the platform.

**Technological goals:** systematic use of tablet pc with QGIS and Perspective Rectifier. Digital workflow: digital photos with tablet (Lenovo Thinkpad) and digital camera; importing raster photos in Perspective Rectifier or QGIS. Ortho-rectification in QGIS or PR. Vectorial drawing with QGIS using specific graphic libraries and table attributes (see final report): this includes elevation points, polygons, lines and polylines characterizing the excavation area. Georeferencing of all the 3D models in Photoscan Pro and implementation in ArcGIS. On site paperless documentation by tablet

PCs (digital drawing of all the units and stratigraphy): pictures taken by tablet camera, rectified in Perspective Rectifier (or QGIS) and then exported in QGIS.

Standardization of all the graphic layout, attribute tables and codes for QGIS and ARCGIS. Laser scanning of the North and South Shelter. Photomodelling and laser scanning of all the layers of B89. Distinction of the units in separated and georeferenced 3D models.

### **Tablet PC**

The tablet PCs (Le Novo e Microsoft Surface) have been used in 3 trenches in the South Shelter (B89, 80, 25) by three different users: E.Biancifiori, J.Issavi, J. Stuart Taylor. In the B89 the documentation related to drawings, maps and sections was completely paperless and made with the tablet.

The entire experience with the tablet after a few days of practice was very positive. The following digital workflows have been tested.

#### **Workflow n.1**

- Positioning of targets and control points on the ground (3-5)
- Georeferencing of the targets/control points by total station (using the grid coordinates of excavation)
- Digital photos by tablet internal camera (8 mp).
- Raster import of the photos on QGIS
- Photo-Rectification by the geo-referencer module of QGIS (or, in alternative by Perspective Rectifier)
- Creation of a geo-tif picture
- Digital drawing (with stylus) over the rectified photos
- Creation of shape files (by layer)
- Standardization of graphic layout, graphic codes, etc. in relation with the master GIS of excavation (so that all the layers are compatible with the general guidelines)
- Integration of all the data in ArcGIS

#### **Workflow n.2**

Similar to workflow n.1 but with these different options:

- Use of DSR cameras (18 mp) for a better recognition of features and control points.
- Use of Librecad for drawing sections or a better control of graphic features.
- Use of Photoscan for the generation of orto-photo or photo-mosaics.

The Lenovo was equipped with QGIS and Perspective Rectifier; the Surface with ArcGIS and Perspective Rectifier. In the first case (Le Novo) the internal camera of the tablet was used for taking photos, sometimes in association with an external digital camera (Canon EOS M). In the second case (Surface) all the photos have been taken by an external camera (Nikon) connected via USB with the tablet.

Pros and cons in the use of internal or external camera. The use of internal tablet camera (8 mp) is very useful when the target is small or medium size (for example a small unit or just a part of a



building): the resolution is sufficient and the shooting position has to be orthogonal. When the target is large or there is too much distortion in using the tablet camera, better to use a DSLR and to download the pictures on the tablet. One more option for on site digital drawing can be the generation of an ortophoto by 3D modeling in Photoscan.

### **Outcome**

The implementation of the tablet in all the phases of documentation and data recording and the standardization of the workflow from computer vision to ArcGIS/QGIS, has substantially increased the standardization and quality of digital data available on site. The procedure is quick and very accurate (always under 1 cm) and this is possible because of the use of vectorial control points (total station) and orto-photos (raster data). Moreover with this approach it is possible to minimize mistakes of the drawer and to compare data interpretation (outlines) with archaeological evidence (raster data and stratigraphy). In fact the tablet is used only on site and this allows the drawer and the excavation team to check the digital map during the excavation and not in post-processing. In other words, all the digital drawing is processed on site and it is completely contextualized in the archaeological fieldwork.

A second tablet was used for sketching, taking notes and comments on the archaeological interpretation of building and stratigraphy. The integrated camera in the tablet is an important additional tool for taking snapshots during the excavation and for working on draft comments, metadata and sketches.

### **Documentary movie**

The participation of a grad student from Duke – Visual Studies – (Braxton Hood) has allowed planning and recording a documentary video on the digital technologies used in the excavation and more in general on the excavation of the B89. This documentary movie will be the first multimedia product on the “3D-Digging Project”.

### **Report on Digital Applications and General Strategies**

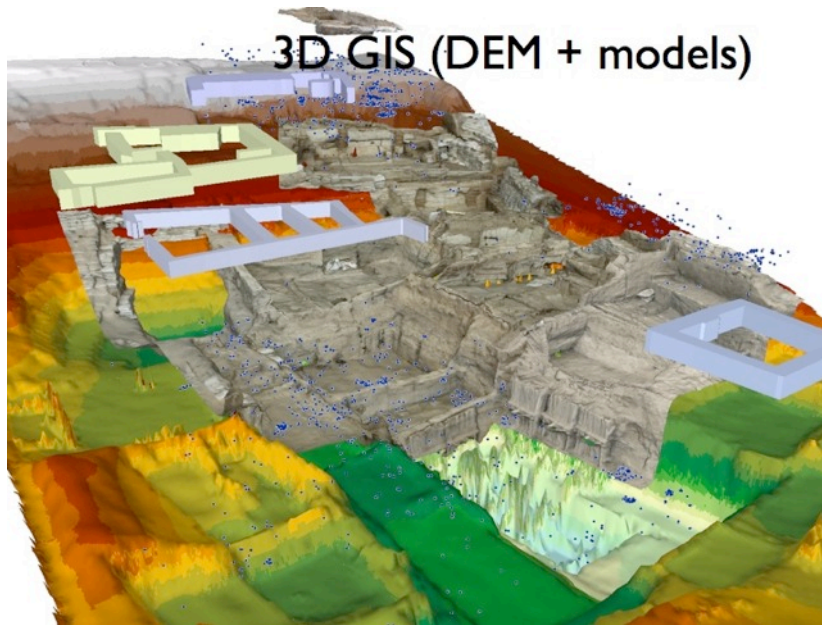
The season 2013 was quite successful in terms of 3D digitalization of models and for the standardization of the entire workflow.

In terms of strategies, all the stratigraphic layers of B89 were recorded in 3D either by computer vision or by laser scanning. (see below the details). In general computer vision was systematically used in micro-scale (single excavation trenches, buildings, burials) and 3D laser scanning in macro-scale (large scale survey).

More specifically, 3D data recording by computer vision was extended to all the burials on the East mound, on B80, B89 , TPC and in a sample of other buildings (East mound).

The use of Photoscan Pro has allowed the georeferencing of all the models using the excavation grid and in that way all the 3D models were exported in ArcGIS-Arc-Scene and standardized in a geodatabase.

The implementation of 3D laser scanning models for ArcGIS was successful and all the 3D models are usable and georeferenced also in ArcScene.



A further step was the interpolation of laser scanning data for the generation of DEMs (Digital Elevation Models) in TIN and raster format (Figs.18.2). The creation of DEMs by laser scanning is able to visualize very detailed features of the archaeological excavation (North and South shelter East Mound) in relation with the surface model of the terrain. For example different colors and contour levels can better analyze the entire area of excavation in the environmental context of the mound.

Figure 18.2. DEM and laser scanning data combined

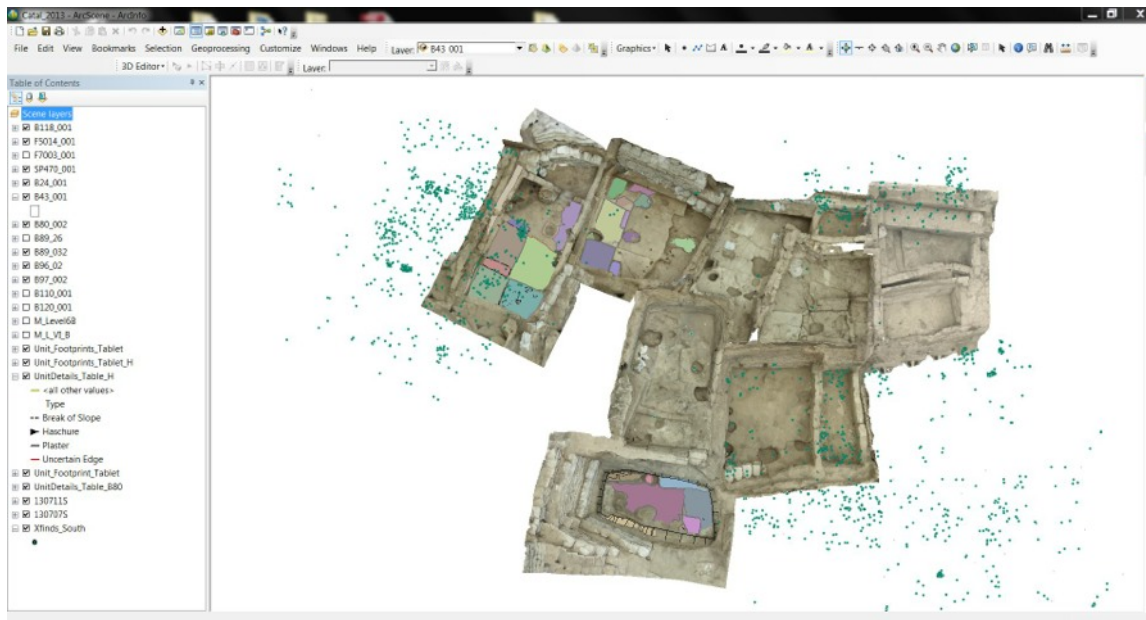


Figure 18.3. The matching of DEM and excavation data.

The overlay of the DEM with 3D models of buildings reconstructed in computer vision (Fig.18.3) shows the perfect matching between laser scanning data and computer vision models. In this way it is possible to interpret correctly the complex stratigraphy of the site and the state of the art of archaeological excavation in 2013.

Finally all the Mellaart excavation phases (spatially recognizable, Fig. 18.4) have been integrated in ArcScene with the more recent 3D models made by computer vision. The spatial effect is very



Figure 18.4. The integration of the Mellaart excavation phases in ArcScene

impressive: the superimposition of houses, buildings and finds in 3D reveals the diachronic evolution of the site across the I-VII identifiable Mellaart phases. This initial experiment opens new perspectives in the study of the reconstruction of the center and its relation with the landscape.

## Laser Scanning



Figure 18.5. Part of the laser scanning work done in the North Shelter.

The laser scanning data recording had been focused on B89, TPC (I-II) area, South Area and North Area. For the second year in a row the laser scanning survey

has been performed using a Faro Focus 3D Shift Phase laser scanner, a powerful, portable, and accurate device for outdoor survey. This equipment is capable of 2 mm precision on a 80m distance scan lasting about 15/20 minutes and producing a 40/50 million colored point cloud (3D data set made of points characterized by X,Y,Z coordinates and RGB colors produced by a built-in color camera featuring an automatic 70 megapixels parallax-free color overlay). This incredibly high amount of information proved inadequate to the scope of laser scanning documentation at



Çatalhöyük being the amount of data almost unmanageable on site and way too accurate for our processing and visualization workflow. Therefore we adopted a scan quality of 1/8 and a resolution of 1/4 and produced, in a time span of less than 5 minutes per scan, accurate point cloud with a resolution of about 5500 x 4000 pixels and about 11 million points per scan (for example, see Fig. 18.5). Moreover the built-in camera of the Faro Focus 3D is able to add adequate color information to the point clouds merging brightness and color automatically.

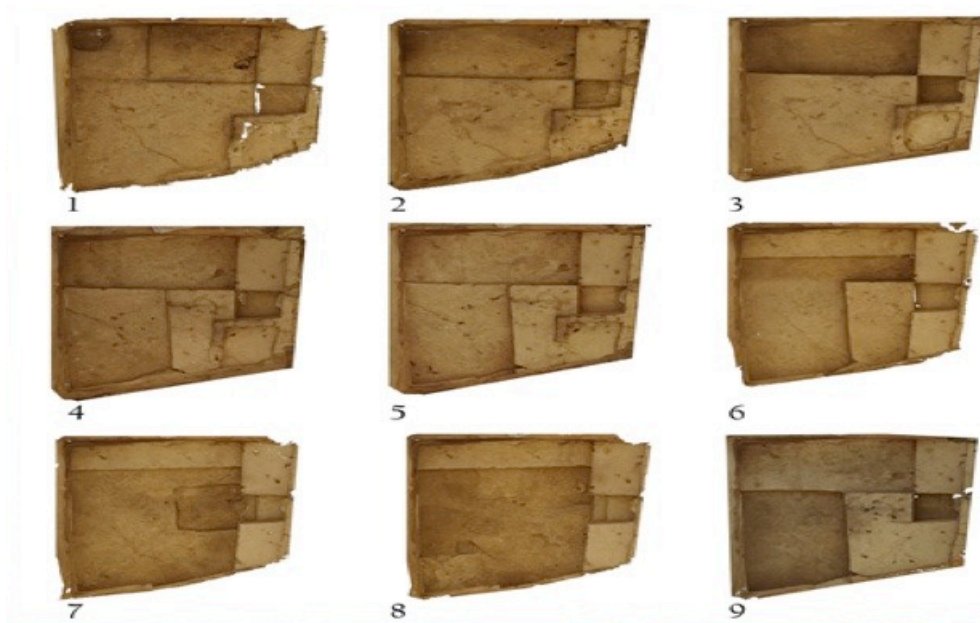


Figure 18.6. Stratigraphic sequences in B.89.

Every stratigraphic unit of B89 has been scanned several time to allow a homogenous and dense point cloud to be generated. In addition each scan has been automatically aligned using automatic aligned functionality and processing in Faro Scene 5.1 software, and later georeferenced

using total station points provided by the total station survey team. The automatic alignment of 3D scans has been possible by semi-manual recognition of white sphere targets that were placed around the perimeter of B89 and paper checkerboard target taped to the perimetral wall of the South Shelter. A high resolution (18 Megapixel) DSLR camera has also been employed to take higher quality photographs of each unit of B89 in order to add the point clouds precise and vivid texture colors (RGB information). These photos were eventually added to the registered and edited point clouds using texture parameterization tools in the open source software MeshLab.

The same FARO Focus 3D laser scanner and sphere and checkerboard targets have been also employed on a macro-scale level for the digital documentation of the East Mound. Areas such as South Area, TPC, and North Area have been surveyed along the excavation season 2013 between the beginning of June and beginning of August. This area-wide scanning acquisition occupied 2 operators for about 3-4 full work days for the North and South Areas and a couple of hours only for the TPC area. A considerable amount of laser scanning data has been post-processed on site during lab hours by the Duke team, specifically the one related to the B89. Given the great deal of data from the area-wide scanning just a part of 120 point clouds related to the North-South Shelter, and TPC areas have been processed on site.

### Computer vision (Buildings and burials)

The photographic campaign was performed using a Canon Eos 550 D (lens Sigma Ex DG 15mm). Once acquired the images were processed in Agisoft Photoscan Pro in order (i) to estimate the position of the cameras, (ii) to generate the geometry, (iii) to project the color information (automatic generation of high resolute texture) and (iv) to geo reference the models in relation to the coordinate system in use.

The version of Photoscan employed during this season allowed defining a new and more efficient workflow, reducing exponentially the time spent to process the images and to generate the models. In order to be imported into the GIS, the models were optimized up to 34000 polygons and exported in collada (.dae). Once imported into ArcGIS the files were transformed and archived as a multipatch, the use of this format allowed defining a table of attributes to connect with the 3D data. At the end of the season the entire South Shelter was digitalized and imported into the geo-database of the excavation. The use of Arcscene allowed visualizing the 3D models in spatial relation with the graphic documentation previously realized on site.

Workflow	Season 2012	Season 2013	description
Markers	X		Use of specific markers
Acquisition campaign	X	X	Image acquisition process
Photoscan	X		The images are processed in order to realize a 3D model
Photoscan PRO		X	The images are processed in order to realize a geo-referenced 3D model.
Meshlab	X		3D points from the total station are used in Meshlab to geo-reference the model.
3DSMax	X		The model is optimize and exported in .3ds
ArcGIS	X	X	The model is imported into the geo-database and visualized in ArcScene

Table 18.1. The comparison between the workflow developed in 2012 and the workflow developed in 2013

During season 2013, this technique has been used in three different contexts: (a) 3D acquisition of the stratigraphic units of the building 89, (b) 3D documentation of the ongoing excavations in South Shelter, (c) 3D documentation of the burials.

Despite the different approaches adopted during the acquisition campaign (a specific strategy has been defined for every typology of material), the same workflow of data development has been used to records units, spaces, buildings and features. At the end of the season all the models have been imported in the excavation geo-database and have been visualized in the GIS platform.



## Çatalhöyük @ DiVE

The DiVE, Duke Immersive Visualization Environment is a 3m x 3m x 3m stereoscopic rear projected room with head and hand tracking and real time computer graphics. All six surfaces – the four walls, the ceiling and the floor – are used as screens onto which computer graphics are displayed.



Figure 18.7. DiVE, Duke Immersive Virtual Environment: B89, a Neolithic house, South Shelter

All the 3D models processed during the excavation of B89 have been implemented for the DiVE which allows a 1:1 scale, immersive representation of a mud brick Neolithic house (Fig. 18.8). The digital documentation process of Building 89 has produced a rich set of multimodal information including terrestrial laser scanning data, image-based 3D models, GIS, drawings, pictures, videos, which can be . In addition, the immersive experience is enhanced by in-context stratigraphic units layer menu, volumetric visualization of the excavated areas, *shaders*, and collaborative interaction.

## 19. Back To Mellaart A Area: Survey On Late Neolithic Architecture

Marek Z. Barański, Gdansk University

The architecture of Late Neolithic Çatalhöyük was investigated in the course of TPC excavation and PhD project (Barański 2011) within Mellaart A Area at the top of a mound. The main focus of this one-man survey was to reexamine the relics of the buildings that were unearthed during the 1960's seasons (Mellaart 1962; 1963). In particular, I intended to tackle the following issues: (1) accuracy of existing plans of Mellaart's (2) structural character and quality of the buildings in terms of brickwork bonds and (3) stratigraphic relationship between the unearthed building structures.

The research was regarded as important because the generally accessible plans that cover the very most of up to now unearthed area of Levels I-III have become more and more problematic in the last few years. The recent works on chronological model of the site (Bayliss, Farid 2012) as well as analysis of TP and TPC architecture (Marciniak, Filipowicz, Mickel 2012; Czerniak, Marciniak in press; Barański in press) casted considerable doubt on past interpretations of not only building techniques and strategies but also spatial organization of the settlement in its latest phases of occupation. The research situation is difficult as there is not much information on late Neolithic buildings that can be brought from Mellaart's publications (Hodder 1996; Düring 2001; Barański 2011). Under the circumstances there was every reason to be suspicious about the accuracy of recording that took place in these early days. Nevertheless, Mellaart's plans that were digitized and integrated into the site local grid (Mackie, Hall 2007; Barański 2010), are all we have. That is why the idea behind the research was to make use of them in order to open a dozen or so small trenches in the places where corners of the buildings were recorded. It was believed that revealing upper parts of the walls and reinterpreting building structural relationship would make it possible not only to reassess the building's outlines and to learn more about the building techniques and strategies but also first and foremost redefine the spatial organization of the mound in its latest phases of occupation.

Having Trimble S8 Total Station at my disposal - a robotic instrument that offers 1" angular accuracy and EDM precision of 1 mm + 1 ppm as well as good few-years' experience on TP architecture and stratigraphy (Marciniak et al in press) seemed enough to get results. This approach, however, had to be modified during the survey as all the plans and some of the past interpretations quickly turned out to be highly inaccurate and most of the walls were heavily disturbed and eroded.

Firstly, there were mistakes in locations of most of the unearthed mud-brick walls. A great effort was made to rescale, rotate and, as a consequence, adjust the plans to the structures revealed on the surface, but even so I failed due to inconsistency of the past mistakes that ranged between about 0.5 and 2.5 m (!). The corners of the buildings turned out to be difficult to trace and many of the trenches had to be either enlarged or closed and opened in other location. Moreover, some of the walls that were revealed could not be linked with the ones recorded on the plans,

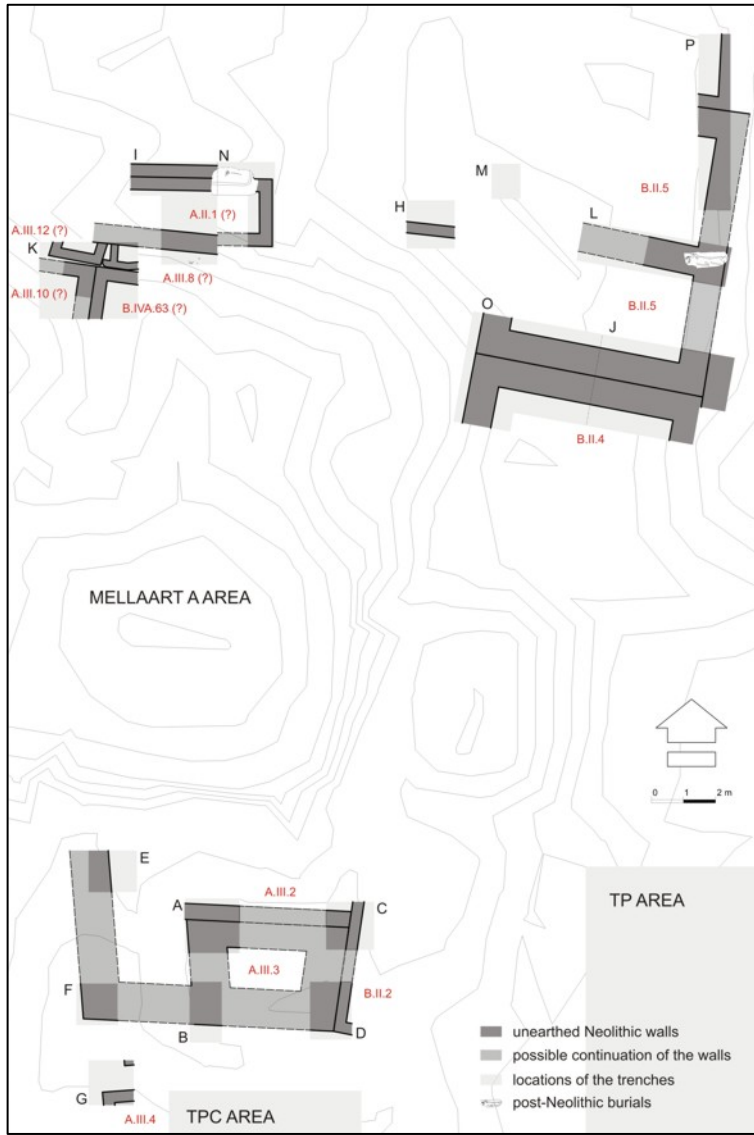


Figure 19.1. The fields of investigation. Plan: Marek Z. Baranski

which heighten doubts about what was drawn and removed and what was unearthed and left unexcavated during the 1960's excavation season. All this was very frustrating.

Secondly, the existing plans were difficult to assess as they appeared to be representative of not only multiple phases of one building but also different or even unctemporary buildings that were sometimes incorrectly recognized as a consequence of phasing the site by horizontal levels. It was confirmed that in these early days Mellaart was really finding his feet (Farid 2013, pers. comm.) and tended to include most of the mud-brick structures he had seen on the surface on just one multi context plan. The challenge to reinterpret and reconstruct late Neolithic events turned out to be very difficult as the research was generally restricted to ground truthing. True, there were some useful wall sections and decisive structural analysis with respect to brick

bonding made, but still little stratigraphic relationship could be seen without proper excavation.

Third, the surface scraping was undertaken in a fast track mode that precluded sampling and dry sieving of the removed deposits. Nevertheless, the backfill of the former excavation area contained a great number of inclusions and aggregates that had to be collected even though they were of little archaeological value. This was undoubtedly troublesome, yet what really slowed down the research were post-Neolithic burials that had been left partly unexcavated by Mellaart's team. The situation came as an unpleasant surprise and forced considerable changes in the research plans.

Irrespective of all the difficulties briefly mentioned above 20 trenches were opened in different parts of the Area, which enabled to reveal some upper parts of walls attributed by Mellaart to Levels II-III. All those structures were heavily affected by the post-depositional processes

including truncation, erosion and disturbance by animals and plants. There were hardly few original brick's dimensions that could be measured. Moreover, none of the buildings or even walls was unearthed in its entirety due to general small area of all the trenches. Nevertheless, the following results were obtained:

#### Trench TPC.A (1.7 x 1.7 m)

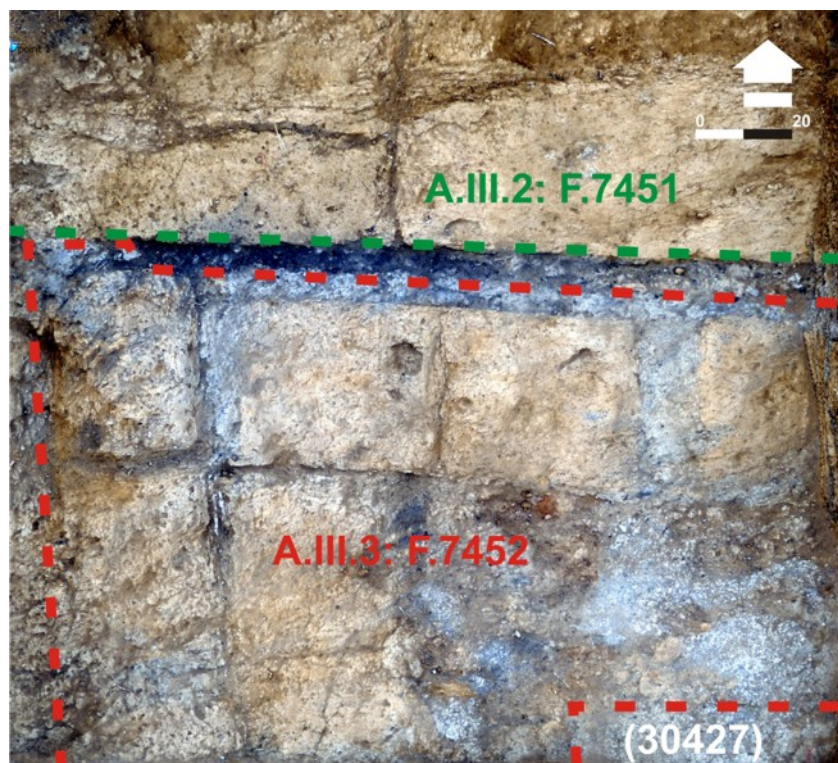


Figure 19.2. Overview of Trench TPC.A. Photography: Marek Z. Baranski

Location within site local grid: A (957.50, 991.30); B (957.50, 993.00); C (959.20, 993.00); D (959.20, 991.30) (Fig. 19. 1);

There were features: F.7452 and F.7451 registered within the trench after the top soil was removed as an arbitrary layer (30400). They were defined as parts of walls of buildings: A.III.3 and A.III.2 respectively (Fig. 19.2).

Feature F.7452 consisted of two perpendicular structures that made up a north-west corner of building A.III.3. Its brickwork was clearly thicker than the width of any of the individual bricks. However, it was not obvious whether the

courses were laid on top of one another to build up what is defined today as one or one and a half brick thick walls (about 0,8 or 1,2 m). This confusion resulted from a small trench area as well as heavy destruction of the bricks that constituted the inside corner of the building. True, there was a possible floor make-up (30427) revealed in the very south-east corner of the trench, which consisted of light-grey and white pebbles up to 4 mm in diameter, but it was not enough to confidently define the outline of the building's interior.

Another thing to consider was the existence of only one or two skins of bricks in the case of the exposed course of the northern wall of the building while the eastern one seemed to have two or three skins depending on where the wall's internal outline was. A vertical layer of possible mortar covering the external side of the preserved, northern wall might be a hint to reconsider its greater thickness. On the other hand, it may indicate an external face of the wall that was built against another, older structure.



Irrespective of these doubts, the two walls of building A.III.3 were made up of mid brown / light orange mud-bricks with more or less equal silt and sand content. The mortar had light / mid grey colour and contained organic material and aggregates.

Feature F.7451 was defined as a southern wall of Building A.III.2 and was situated to the north of Building A.III.3. The parallel walls of the two distinct structures, were situated on the west - east axis and were separated by a few-centimeters' thick ashy layer expanding upwards. This is where a nicely made, wooden spatula and a worked stone (30400: X2 and X3 respectively) were found.

The mentioned fragment of the wall consisted entirely of courses of stretchers. This half brick thick structure had its northern side truncated, which made it impossible to reconstruct its original width. The wall was made up of hard, light grey / mid brown mud-bricks with a dominant silt content. The difference between the bricks and the mortar was almost impossible to record as both elements seemed to have the same physical characteristics. Whether building A.III.2 was a later addition to building A.III.3 or was it the other way round was not clear. However, it seemed likely that the first of them was built against the other causing its partial destruction.

#### Trench TPC.B (1.0 x 1.9 m)



Location within site local grid: A (957.65, 988.50); B (957.65, 990.40); C (958.65, 990.40); D (958.65, 988.50) (Fig. 19.1);

The top soil that mostly contained backfill and the upper, heavily disturbed courses of bricks, was removed within an arbitrary layer (30401). Then there were: fine layers of midden (30428) and a mud-brick wall F.7453 registered within the trench (Fig. 19.3).

Feature F.7453 was defined as a south-west corner of building A.III.3 and seemed to be what is defined today as one and a half brick thick wall (about 1,2 m) with three skins of bricks in a stretcher course and a brickwork bond that comprised two courses of stretchers between a course of a

Figure 19.3. Overview of Trench TPC.B. Photography: Marek Z. Baranski



header. The wall was made up of mid brown / light orange mud bricks with more or less equal silt and sand content. The mortar had light / mid grey and light brown colour and contained considerable amount of aggregates and organic material. It is quite possible that the wall continued to the west as there were bricks seen in the western section of the trench. This could have meant that the original outline of the building was bigger and therefore different from the one recorded on Mellaart's plans of Level III.

As far as fine layers of midden (30428) are concerned they were exposed in the southern part of the trench. A very preliminary study of these sediments suggested short-term deposition, which casted doubt on Mellaart's interpretation of the area as a place where a proper street ran.

#### Trench TPC.C (1.5 x 1.5 m)

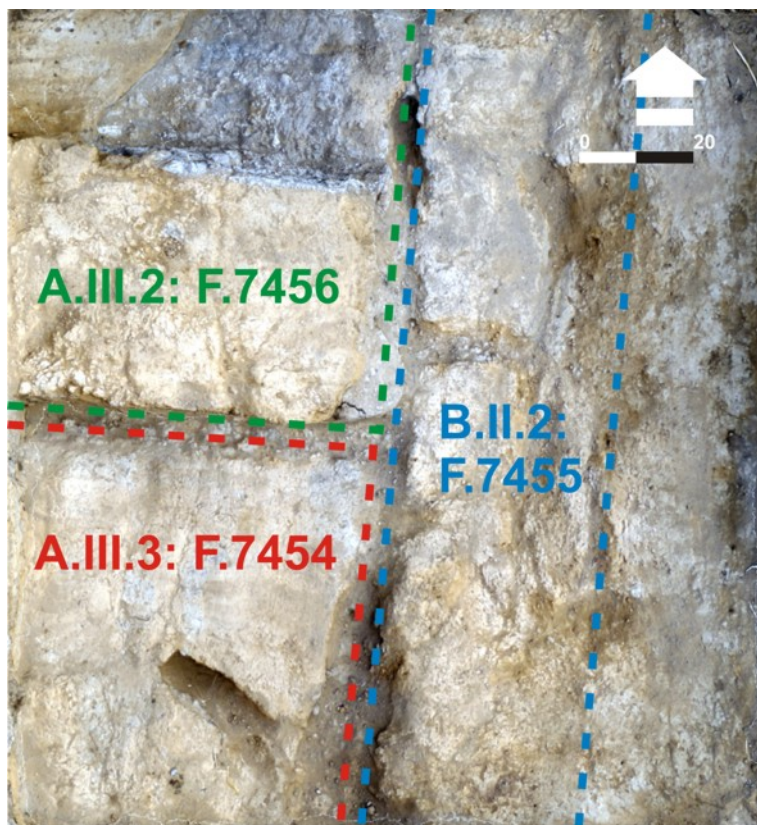


Figure 19.4. Overview of Trench TPC.C. Photography: Marek Baranski

Location within site local grid: A (961.90, 991.40); B (961.90, 992.90); C (963.40, 992.90); D (963.40, 991.40) (Fig. 19.1).

There were features: F.7454, F.7455 and F.7456 registered within the trench after the top soil was removed (30402). They were all defined as parts of mud-brick walls of what seemed to be the north-east corner of building A.III.3, the western wall of building B.II.2 and the south-east corner of building A.III.2 respectively (Fig. 19.4).

Feature F.7454 was a massive structure as its brickwork was thicker than the width of any of the individual bricks. However, down to limited trench area, it was not clear whether the courses were laid on top of one another to build up one or one and a half brick thick wall.

Irrespective of the type of a bond, the bricks were of mid brown / light orange colour and had more or less equal silt and sand content. The mortar had in turn mid grey / light brown colour and contained a considerable amount of aggregates and organic material.

There was also a western wall F.7455 of building B.II.2, which, in turn seemed to be a half brick thick structure. It was found adjacent to the eastern, exterior face of the massive building A.III.3. The northern face of the wall was eroded, which made it impossible to reconstruct its original width. However, it seemed that the upper courses of bricks had been exposed to fire, which

might suggest that the building had been burnt. The lower courses were made up of light brown / light grey mud-bricks with a dominant silt content. The difference between the bricks and the mortar was clear, the latter having mid grey colour and containing organic material.

The most complex stratigraphic situation occurred in relation to the place, where south-eastern corner of building A.III.3 was expected to be found. It came as a surprise when only southern wall was revealed. It was defined as a half brick thick structure (about 0,45 m) and was made up of light grey / mid brown bricks with a dominant silt content. Fine layer of wall plaster covered the northern face of the wall and surprisingly seemed to continue on the eastern face of the perpendicular wall of building B.II.2. This gave rise to the question about the actual relation between the two building structures. It might be possible that the northern wall of building A.III.2 was either truncated when building B.II.2 was erected or that building A.III.2 was built against the western wall of building B.II.2. Another interpretation might be that the two mentioned buildings actually made one, integral building structure, yet all this deliberation should be treated with caution due to very limited trench area.

#### Trench TPC.D (1.3 x 1.8 m)

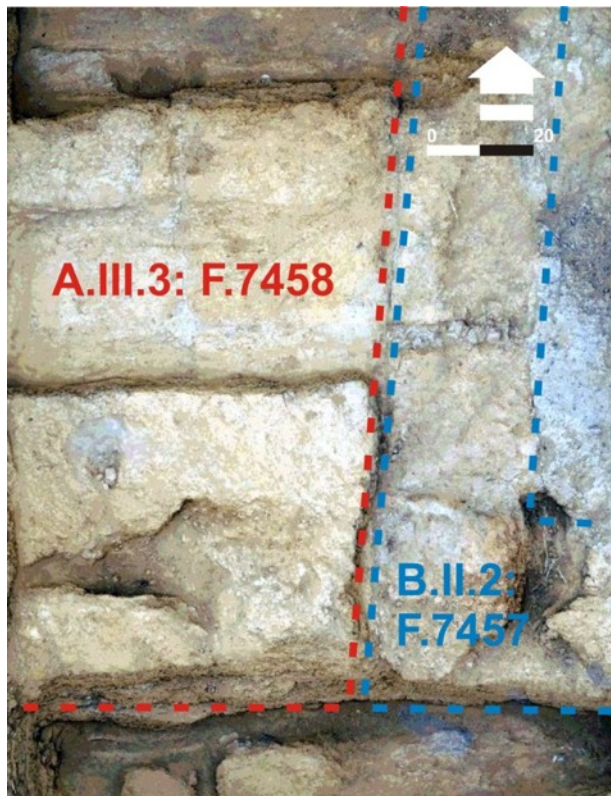


Figure 19.5. Overview of Trench TPC.D. Photography: Marek Baranski

Location within site local grid: A (961.40, 988.60); B (961.40, 990.40); C (962.70, 990.40); D (962.70, 988.60) (Fig. 19.1);

There were features: F.7457 and F.7458 registered within the trench after the top soil was removed as arbitrary layer (30403). They were defined as parts of mud-brick walls of buildings: B.II.2 and A.III.3 respectively (Fig. 19.5).

Feature F.7458 was defined as a south-west corner of building A.III.3 and was one and a half brick thick wall (about 1,2 m) with three skins of bricks in stretcher course. Its brickwork bond seemed to comprise two courses of stretchers between a course of a header. All bricks had mid brown / light orange colour and more or less equal silt and sand content. The mortar had light / mid grey and light brown colour and contained considerable amount of aggregates and organic material.

There was a possible foundation cut along the southern face of the wall observed. It seemed to cut through a mud-brick structure that was not recorded on Mellaart's plans.

The eastern face of the wall that was situated on the north-south axis was adjacent to feature F.7457, which made up a south-east corner of building B.II.2. It seemed to be half brick thick



wall (about 0,35 m). The upper courser of bricks bore the traces of having been exposed to fire, which might suggest that the building had been burnt. The lower courser, in turn were made up of light yellow / light grey mud bricks with a dominant silt content. The mortar had mid grey colour and contained organic material.

Trench TPC.E (1.5 x 1.3 m)

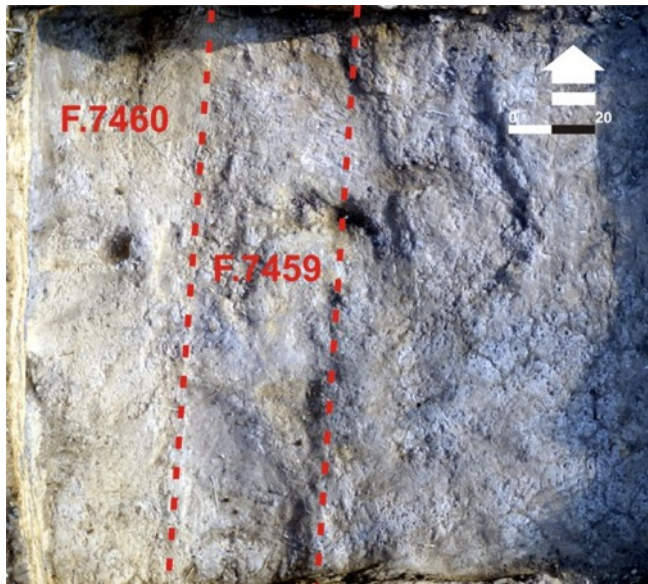


Figure 19.6. Overview of Trench TPC.E. Photography: Marek Baranski

Location within site local grid: A (954.50, 993.20); B (954.50, 994.50); C (956.00; 994.50); D (956.00, 993.20) (Fig. 19.1);

The top soil that mostly contained constructional material was removed within an arbitrary layer (30405). Then there were features: F.7459, and F.7460 registered within the trench. They were defined as parts of unattributed mud-brick walls situated on the north – south axis and adjacent to each other (Fig. 19.6). Due to heavy erosion the character and stratigraphic relationship between the walls were hard to define. It is possible that they might have made up one brick thick structure that was recorded on Mellaart’s plan to the east of A.III.2 and A.III.3.

However, no brick bonding was observed between the two unearthed courses of the bricks of the walls. Both features were made up of light grey / light orange bricks with a dominant silt content. The difference between the bricks and the mortar was not always clear as the latter had various colouristic attributes ranging between mid grey and light or mid brown. This might suggest that the structure either underwent some repairs or was made up of a reused constructional material.

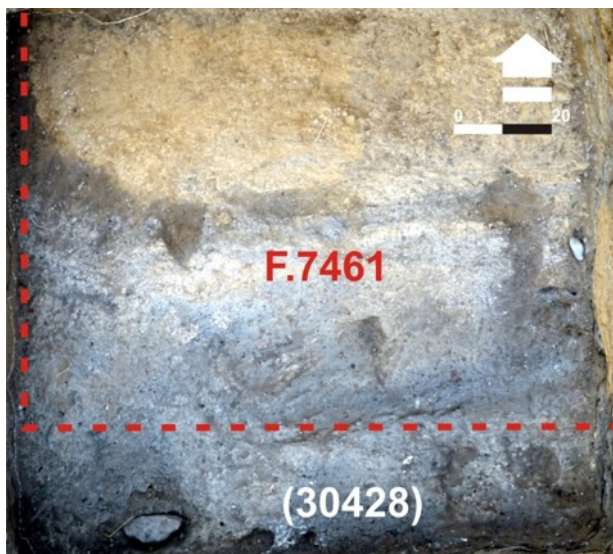


Figure 19.7. Overview of Trench TPC.F. Photography: Marek Baranski

Trench TPC.F (1.3 x 1.3 m)

Location within site local grid: A (954.10, 989.05); B (954.10, 990.35); C (955.40, 990.35); D (955.40, 989.05) (Fig. 19.1);

Fine layers of midden (30428) and unattributed walls: F.7461 and F.7462 were registered within the trench (Fig. 19.7) after the top soil was removed (30406).

Feature F.7461 was one brick thick wall (about 1,2 m) that can most probably be linked with an unattributed structure situated on the north-

south axis and recorded on Mellaart's plan of Level III east to building A.III.3. It was made up of light brown / light grey mud bricks with a dominant silt content. The mortar had mid grey colour and containing organic material.

The southern end of the wall was clearly tilted towards south and seemed to be covered with fine layers of midden (30428) that were also exposed in the southern and eastern part of the trench. Then feature F.7462 made up of one course of bricks of light brown colour was placed directly on top of this sequence. At first glance it seemed to make up a separate structure, but could as well be a part of feature F.7461 marking its partial conversion or a corner of a building. There is a possibility that all the walls recorded within trenches TPC.F and TPC.B constitute one, massive building structure. However, this can only be confirmed by a more complex survey that would include exploration.

#### Trench TPC.G (1.4 x 1.4 m)

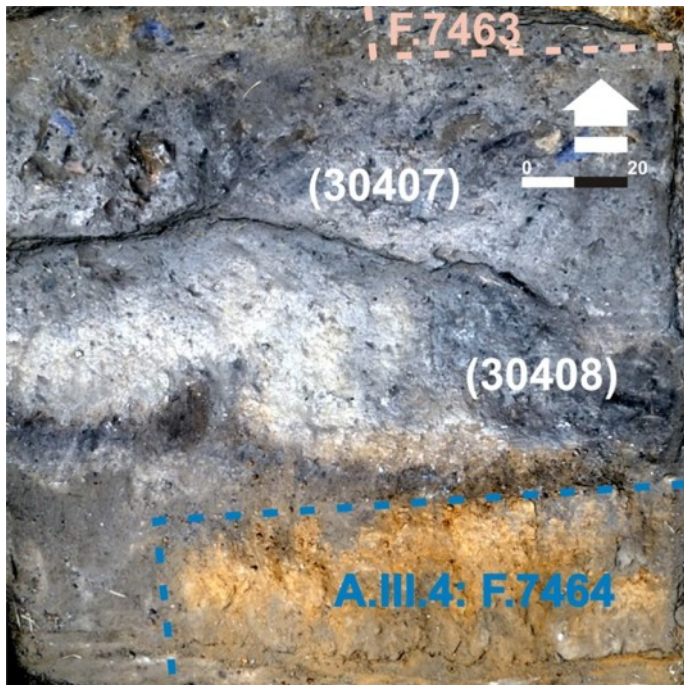


Figure 19.8. Overview of Trench TPC.G. Photography: Marek Baranski

Location within site local grid: A (954.50, 986.55); B (954.50, 987.95); C (955.90, 987.95); D (955.90, 986.55) (Fig. 19.1);

The top soil that contained a great number of inclusions was removed within an arbitrary layer (30407). Then further fine layers of midden (30408) and features F.7463 and F.7464 defined as walls were registered within the trench (Fig. 19.8). Feature F.7464 was a north-west corner of a possible western annex of building A.III.4. The walls were half brick thick (about 0,35 m) and were made up of dark orange / light brown mud bricks with a dominant sand content. The difference between the bricks and the mortar was more or less clear, the latter having mid grey colour.

Only a small part of one course of bricks that constituted feature F.7463 was unearthed in the north-east part of the trench. It seemed to be made up of light orange / light brown bricks with more or less equal silt and sand content. The wall was erected on fine layers of midden containing a great number of inclusions in the form of animal bones, pottery, stones and obsidians. A very preliminary study of these sediments suggested once again short-term deposition and an open character of the space, which casted doubt on Mellaart's interpretation of the area as a place where a proper street ran. Part of the midden was excavated (30407) and sampled by micromorphologist Aroa Garcia-Suarez to shed more light on this deposit and character of the area. The layers (30407 and 30408) were defined as "same as" fine layers of midden (30428) recorded in trenches TPC.B and TPC.F.



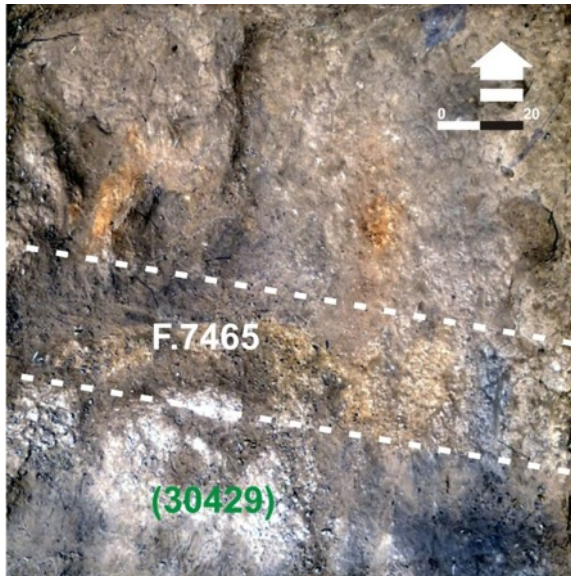


Figure 19.9. Overview of Trench TPC.H. Photography: Marek Baranski

Trench TPC.H (1.5 x 1.5 m)

Location within site local grid: A (964.40, 1013.30); B (964.40, 1014.80); C (965.90, 1014.80); D (965.90, 1013.30) (Fig. 19.1);

The trench was set up in a place where one of the corners of building B.II.5 was expected to be found. There was an unattributed partition wall F.7465 found instead after the top soil was removed (30409) (Fig. 19.9). It was abutted from the south by a possible floor or platform (30429). Both structures were hard to measure and describe because of their heavy damage and erosion. Moreover, a small trench area and the inaccuracy of Mellaart's plans made it impossible to link them convincingly to anything that was recorded on the plans of Levels II and III.



Figure 19.10. Overview of Trench TPC.I. Photography: Marek Baranski

Trench TPC.I (2.7 x 3.2 m)

Location within site local grid: A (956.75, 1012.80); B (956.75, 1014.95); C (955.80, 1014.95); D (955.80, 1016.00); E (958.50, 1016.00); F (958.50, 1012.80) (Fig. 19.1);

The trench was set up on a steep slope in the northern part of Mellaart's A Area. The top soil was removed within an arbitrary layer (30410) and contained a great amount of loose fragments of constructional material as well as some disarticulated human bones that might have belonged to post-Neolithic burial F.7480 found within adjoining trench TPC.N.

There were features: F.7473, F.7474 and F.7475 registered within the trench (Fig. 19.10). They were all defined as mud-brick walls situated on the west-east axis. The first two seemed to be half brick thick structures (about 0,40 m) that abutted each other. They were situated in the northern part of the trench on a layer of very compact infill. The western part of feature F.7473 was truncated, while the eastern continued in the trench TPC.N and constituted a north-east corner of a space that might have been a part of shrine A.II.1. The wall



was made up of mid brown / mid orange mud-bricks with more or less equal silt and sand content. The mortar had light grey colour.

Feature F.7474 was situated next to the northern face of wall F.7473. It was badly preserved and seemed to have been exposed to fire, which might suggest that the building had been burnt. Due to erosion and a small area of the trench it turned out to be impossible to convincingly link the wall to anything that had been recorded on the plans of Level II. Wall F.7475 was situated in turn in the southern part of the trench and might have defined one of the spaces of shrine A.III.8 as it continued in trench TPC.K. It was made up of light grey mortar and light grey / mid yellow mud-bricks that seemed to have equal silt and sand content. There was a cluster of disarticulated human bones (30421) found at the base of the wall in the southern part of the trench.

#### Trench TPC.J (4.2 x 2.9 m)

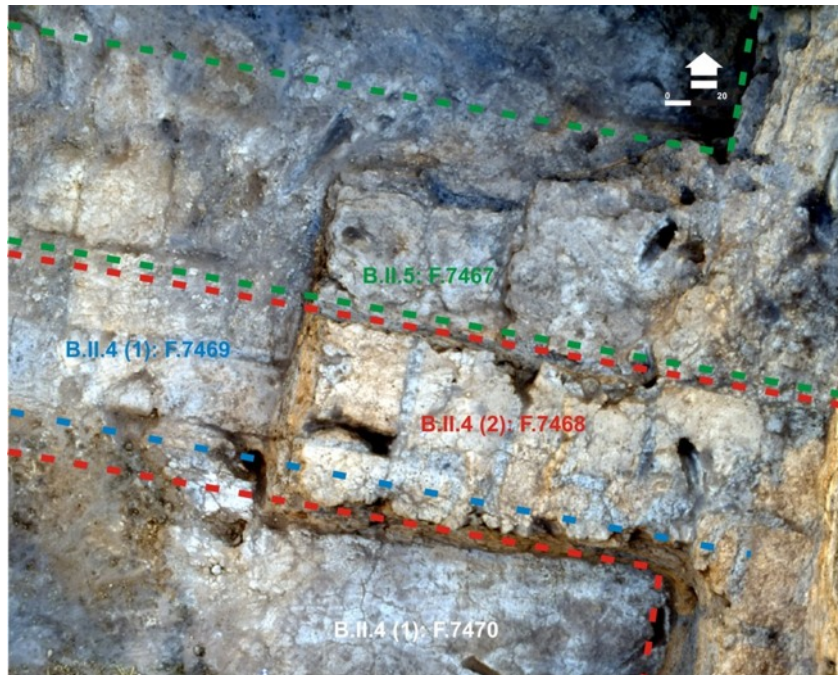


Figure 19.11. Overview of Trench TPC.J. Photography: Marek Baranski

Location within site local grid: A (979.00, 1007.77); B (970.51, 1010.62); C (974.64, 1009.89); D (974.34, 1008.21); E (973.55, 1008.35); F (973.34, 1007.17) (Fig. 19.1);

The top soil was removed within an arbitrary layer (30411) and included mostly backfill within which disarticulated human bones were found. Then features: F.7467, F.7468, F.7469 and F.7470 were registered within the trench (Fig. 19.11).

The first three were defined as massive mud-brick walls of

buildings B.II.5 and B.II.4. However, building B.II.4 had to be divided into two autonomous structures: B.II.4 (1) and B.II.4 (2) due to incorrect attribution of the walls to buildings that had been proposed by Mellaart.

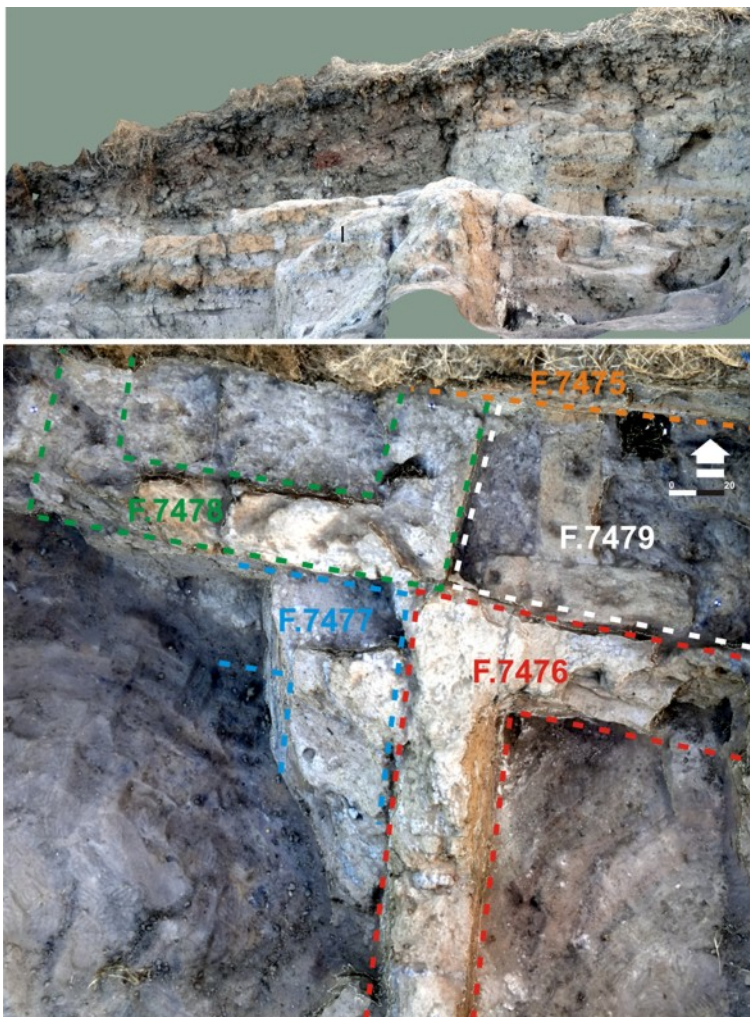
Feature F.7469 seemed to be the earliest structure in the observed stratigraphical sequence. It was defined as northern wall of building B.II.4 (1) and was made up of hard light grey / light brown mud-bricks with a rather dominant silt content. The difference between the bricks and the mortar was almost impossible to record as both elements seemed to have the same physical characteristics. The wall was closely connected with a relatively well preserved platform or floor

layer F.7470 that abutted it from the south. It could be stated for certain that those two structures constituted one of occupational phases of the same building.

Feature F.7468 was situated directly on top of both wall F.7469 and platform F.7470. Therefore, it was considered to be a later structure and defined as a north-east corner of building B.II.4 (2). The feature was a massive, one and a half brick thick wall (about 0,90 m) with three skins of mud-bricks in a stretcher course. The inner skin seemed to be made up of reused or less qualitative material. That kind of bond remained of a simple composite wall built of combination of two masonry units – one forming the facing of the wall and the other its inner part. Therefore, the wall was made up of various light grey / light brown mud-bricks with a rather dominant sand content. The difference between the bricks and the mortar was hard to record, the latter being slight darker in colour.

Feature F.7468 was clearly tilted towards south, which might be partly explained by the pressure of massive wall F.7467 that was situated to the north of it. This one and a half brick thick structure (about 0,90 m) was defined as a south – east corner of building B.II.5 and was made up of a very similar material to building B.II.4.

#### Trench TPC.K (3.1 x 2.4 m)



Location within site local grid: A (952.95, 1011.10); B (952.95, 1013.60); C (956.00, 1013.60); D (956.00, 1011.10) (Fig. 19.1);

The top soil was removed within an arbitrary layer (30412) and included mostly loose backfill. Then features: F.7476, F.7477, F.7478 and F.7479 were registered and defined as mud-brick walls of four autonomous buildings (Fig. 19.12). Unfortunately, a small trench area and first and foremost the inaccuracy of Mellaart's plans made it impossible to convincingly attribute those structures to the buildings recorded on the plans of Level II, III or VIA.

Feature F.7476 seemed to be the earliest structure in the observed stratigraphical sequence. It was a half brick thick wall (about 0,40 m) that constituted a north – west

Figure 19.12. Overview of Trench TPC.K. Photography: Marek Baranski



corner of a building that might be linked with building B.IVA.63, but this assumption should be taken with great caution. The wall was made up of light grey mortar and light grey / light yellow mud-bricks with a dominant sand content. There was a fine layer of plaster (30417) that covered the inner face of the walls. It was sampled by Burcu Tung in order to run a micromorphologic analysis.

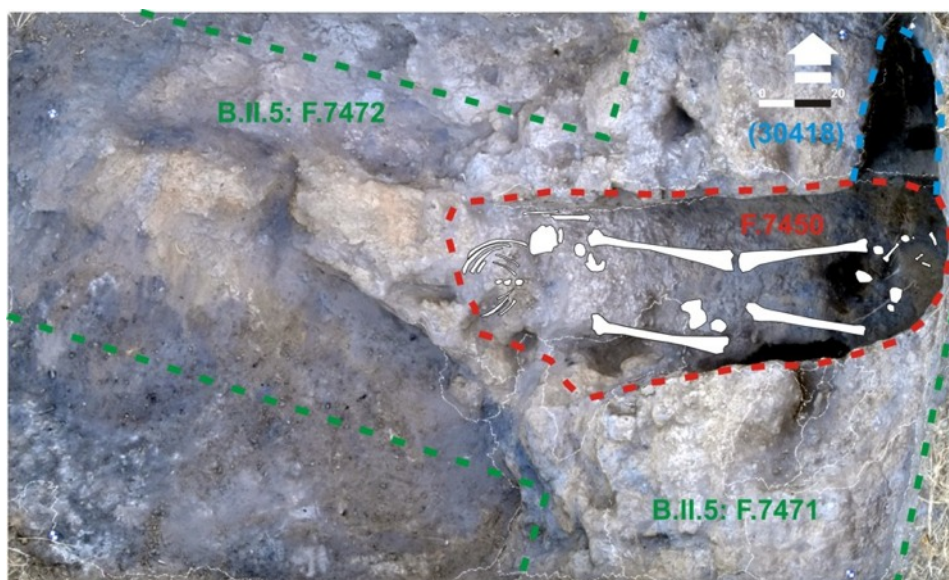
It looked as if feature F.7479 that was situated directly to the north of the wall F.7476, could be contemporary with that structure or might be at least next in the sequence. It was made up of light orange and very distinctive bricks in terms of their width, which was around 22 cm. These bricks constituted walls that seemed to define two small and uncharacteristic spaces, among which the western one bore traces of truncation.

The mentioned damage was caused most probably when feature F.7478 was built on the compound layers of infill that abutted wall F.7479 from the west. It was a half brick thick wall (about 0,30 m) that might have constituted the south-eastern part of building A.III.12, but once again this should be taken with caution. This heavily eroded and disturbed by plants and animals structure was made up of light brown / light orange mud-bricks and mid grey mortar.

Feature F.7477 was just a small fragment of the wall that might have originally constituted the north-east corner of the northern annex of building A.III.10. It was situated on compound layers of infill that abutted from the east wall F.7476 and seemed to be made up of mid grey mud-bricks and light grey mortar.

There was also another wall F. 7475 recorded in the north section of the trench. It was situated above walls: F.7478 and F.7479 and therefore it should be considered as the latest structure that was observed within the trench. The wall was situated on an east – west axis and continued in trench TPC.I. It is not certain whether it constituted the northern wall of shrine A.III.8.

#### Trench TPC.L (4.7 x 1.25 m)



Location within site local grid: A (969.70, 1012.95); B (969.92, 1014.16); C (974.55, 1013.33); D (974.32, 1012.10 (Fig. 19.1);

Burial F.7450 was unearthed within the trench after the top soil was removed as an arbitrary layer (30413). It most probably dated to

Figure 19.13. Overview of Trench TPC.L. Photography: Marek Baranski

Roman or Byzantine Period as it was suggested by the position and lying of the body. The burial consisted of a distinct cut, fine layered infill and a skeleton (30414) that was heavily disturbed by animals and plants, which resulted in displacement of some of the bones. The cranium, mandible and part of the upper abdomen seemed to have been removed during Mellaart's excavation in turn. There were many inclusions found within the infill of the burial, mainly in the form of animal bones. However, no grave goods or adornment were observed and recorded.

The making of the burial resulted in truncation of the earlier features: F.7471 and F.7472, which were defined as the walls of building B.II.5 (Fig. 19.13). They were all additionally heavily eroded and disturbed by animals and plants, which made the interpretation difficult. True, they seemed to be massive walls made up of various bricks in terms of colour and composition, but this should be treated with caution.

There was also an arbitrary layer (30418) defined between fragments of the walls. It was recognized as a separate unit as it contained a cluster of natural stones and a nicely worked stones and horn core (X1, X2 and X3). Only a small part of the unit was excavated as it continued behind both, the northern and eastern, section lines. Its interpretation is not clear and may vary from the pit's infill to a fill layer between the two buildings.

#### Trench TPC.M (0.9 x 1.1 m)

Location within site local grid: A (967.05, 1014.85); B (967.05, 1015.95); C (967.95, 1015.95); D (967.95, 1014.85);

The trench was set up in order to reexamine one of the corners of building B.II.5. However, no mud-brick structures were unearthed. There were in return fragments of horn cores (X1, X2 and X3) recorded at the very base of the trench that most probably marked the initial depth of the Mellaart's excavation works. The top soil was removed within an arbitrary layer (30420).

#### Trench TPC.N (1.8 x 2.7 m)

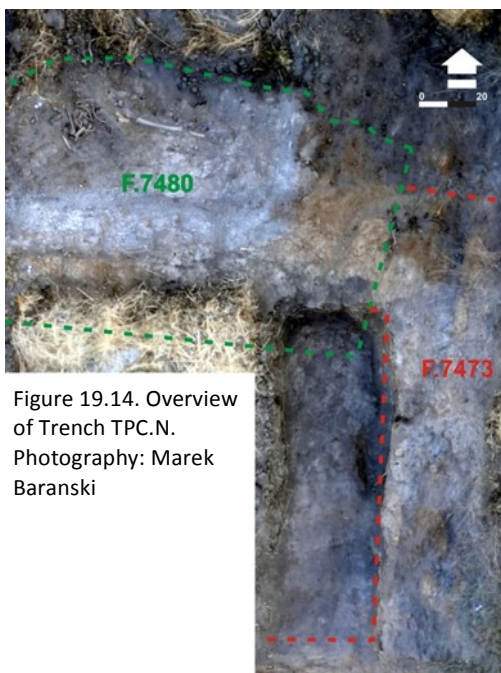


Figure 19.14. Overview of Trench TPC.N.  
Photography: Marek Baranski

Location within site local grid: A (958.50, 1014.95); B (958.50, 1016.00); C (960.30, 1016.00); D (960.30, 1013.30); E (959.45, 1013.30); F (959.45, 1014.95);

The top soil was removed within an arbitrary layer (30423). Then burial F.7480 was unearthed almost just below the surface in the north-western part of the trench (Fig. 19.14). It consisted of a skeleton (30423) deposited within mud-brick structure covered from the inside with a fine layer of plaster. All those elements were heavily eroded and disturbed by animals and roots. Moreover, the northern and eastern part of the burial were badly truncated most probably during the 1960's excavation season as a result of which only part of the skeleton was present. The burial was situated

directly over an earlier, half brick thick wall F.7473 that constituted a north – east corner of what might have been one of the spaces of shrine A.II.1. The southern end of the wall was truncated and the eastern continued to the east and was registered within adjoining trench TPC.I. The top soil was removed within an arbitrary layer (30423).

#### Trenches TPC.O & TPC.P

The idea to follow the outline of the walls that could be visible just below the surface was implemented at the time when digging trenches became too problematic. This is how some further walls of buildings B.II.4 (2) and B.II.5 were revealed within trenches TPC.O and TPC.P respectively (Fig. 19.1). However, it was very difficult to interpret just in plan without excavation as all the walls were heavily eroded and neither stratigraphic relationships nor brickwork bonds could be seen.

#### **Conclusion**

The plans of Mellaart's have been a reference point for decades and for a few generations of various researches. Most of the time these drawings were taken for granted as they represent the only available multi context plans of late Levels. Now, it is clear that they are of limited value down to inaccuracy of measuring devices, as well as simplified stratigraphic analysis and exploration techniques at the time. Not only the real outlines of the buildings rarely match with the plans, but also some buildings have different orientation, structural character and stratigraphic relations to each other. Maintaining a critical attitude towards Mellaart's phasing of the site by horizontal levels seems to be a right thing. How can we reconstruct social organization of the late Neolithic settlement if we are not sure what constituted a single building and which of these building structures were contemporary?

Bearing all this in mind, the reassessment of the plans can be considered as important. In 2013 season only very first step was taken to deal with the problem. The spatial organization of the settlement in its latest phases of occupation still remains a nagging puzzle. There are more questions than answers. Hopefully, some of them can be answered next season due to a more complex research based on structural analysis.

And finally, I would like to thank the Çatalhöyük Research Project Director Ian Hodder for showing confidence in me and making the research possible. I am extremely grateful to my supervisors: Lech Czerniak and Jakub Szczepański as well as Alex Bayliss, Shahina Farid and Arkadiusz Marciniak for their useful comments and some hints on how to improve the workflow next season. Many thanks also go to: Barbara Betz, Nicolò Dell'Unto, Lisa Guerre, Scott Haddow, Jędrzej Hordecki, Justine Issavi, Ashly Lingle, Kamila Pawłowska, Matteo Pilati, Jason Quinlan, Josh Sadvari, James Taylor and Burcu Tung, whose patience and professional support turned out to be crucial on many occasions.

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## 20. Modelling Chronology

Alex Bayliss & Shahina Farid, English Heritage

Steady progress has been made on the scientific dating programme over the course of 2012/13, including the drafting of two articles for publication.

First, following the completion of the final model for the TP Area in Poland in September 2012, Alex and Arek Marciniak drafted an article summarizing this chronology and its implications. The results were also circulated to the post-excavation team working on the TP Area to aid them in completing their discussion texts for the forthcoming volume on the TP Neolithic sequence (Marciniak and Czerniak, in preparation). More detailed modelling continues and will be discussed in a chapter in this volume.

Second, Ian, Alex, and Shahina completed a draft paper updating the chronology for the deep sounding suggested by Cessford (2001). This model includes further radiocarbon dates on articulated bone from Sp.181, which allows the sequence of midden deposits to be included in the model as informative prior information (this was not done by Cessford because of the uncertain taphonomy of the material he dated). This additional information refines the chronology considerably, and suggests that the four meters of midden in Sp.181 accumulated in little more than a century.

The chronologies presented in both papers would be much the poorer without the input of our collaborators from the radiocarbon laboratories, and we thank Fiona Brock (Oxford Radiocarbon Accelerator Unit), Erv Taylor and John Southon (Keck Carbon Cycle AMS facility, University of California, Irvine), and Tomasz Goslar (Poznań Radiocarbon Laboratory) both for their inputs into the respective texts and for the hard work undertaken, both by them and the staff of their respective laboratories, to produce the accurate radiocarbon measurements without which our interpretative models would be nothing.

Dating of the top 3m and bottom 4m of the east mound is thus nearing completion – only the 12m in the middle to go! Following the excavation of the last space (Sp.492) in 2012, which completed the 17-year campaign to excavate a continuous sequence through the South Area, 100 new samples were submitted for dating in January 2013. Results of just over half of these were returned in time for preliminary modelling to be undertaken so that the form of the overall model and the sampling strategy required to bring the dating program to completion could be discussed on site in August 2013.

Sampling in 2013 was comparatively limited, being largely restricted to material excavated during the 2012 and 2013 seasons. Alex sampled six human skeletons with the help of Scott Haddow, and 70 groups of articulating animal bone that had been identified by Adrienne Powell.

Away from site, work continues on the analysis of the new plans from the 1960s excavations which were kindly lent to the project by James Mellaart before his death. Alex and Shahina have identified the 'most reliable' (usually largest scale) plan on which each building recorded by Mellaart appears, and these have been digitised by Cordelia Hall. These plans have then been fitted together using an explicit hierarchy of criteria (for example, five plans show pegs 9 and 10 of the 1965 grid). The next stage of the project will be to tie in the 1960s plans to the Hodder grid and to assess their accuracy in comparison to buildings which have been recorded in both the 1960s and by the current project.

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## 21. Use-wear analysis, 2013

C.Lemorini<sup>1</sup>, D.D'Errico<sup>2</sup>

<sup>1</sup>University of Rome, <sup>2</sup>Leiden University

In summer 2013 a systematic use-wear analysis of the chipped stone tools made of obsidian and chert coming from the Neolithic levels of Çatalhöyük has started. We decided to concentrate this first analysis on one of the best preserved buildings of the Neolithic sequence, Building 65, with the aim of obtaining a functional picture of its living spaces throughout the chronological span of its use. Moreover, we consider it crucial for a correct understanding of the activities carried out inside and outside the building, the analysis of the related middens as well, since in these areas the majority of the exhausted tools were abandoned.

We observed with a stereomicroscope Nikon SZ in reflected light (oculars 10X, objective 1X, magnification range 0,75X-7,5X) all the retouched and un-retouched tools with the exception of midden n.314 for lack of time. Next year, the use-wear analysis of the related assemblage will be carried out and the functional picture of Building 65 will be completed.

The observation with the stereomicroscope allowed to evaluate the degree of conservation of the lithic surface that is quite optimal. Some cases of edge-damages caused by trampling in ancient times and some cases of parasite striations (observed on the obsidian items at a higher magnification with a metallographic microscope) caused by ancient trampling, modern manipulation and conservation in bags containing many tools all together did not prevent the use-wear analysis of the majority of the assemblage. Furthermore, the analysis with stereomicroscope allowed to observe and to appraise the macro-traces, that include edge-removals, edge-rounding and abrasions, with which a first stage of functional interpretation was achieved.

According to macro-traces data, in building 65 and near to building 65 various activities were carried out related to the gathering and processing of soft, medium and hard materials. The majority of the tools were used, re-sharpened and re-used for a long time to attain different tasks or a unique long procedure (as an example, the processing of hide). Moreover, evident signs of the systematic insertion in a haft were detected; recurrently, tools were hafted and re-hafted by changing their position in the haft.

218 implements made of obsidian and 3 items made of chert owning macro-traces of use were successively analyzed with a metallographic microscope Nikon M in reflected light (oculars 15X, objectives 10X, 20X) for the observation of micro-traces (polishes, striations, edge-rounding, abrasions). For lack of time, it was impossible to make a detailed interpretation of the micro-traces observed. We show some example of use-wear observed with the metallographic system; a preliminary interpretation is suggested.

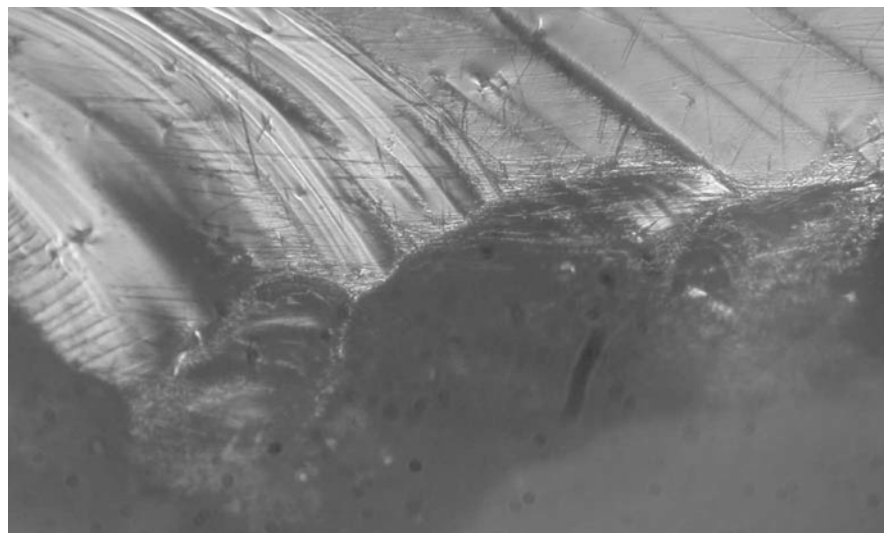
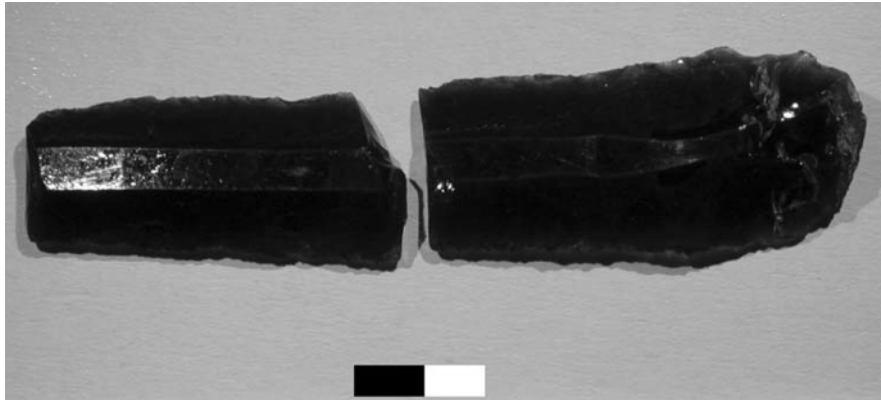


Figure 21.1. B.65, space 297, Unit 13352, A66-115; tool and related use-wear interpreted as cutting medium material(10X)

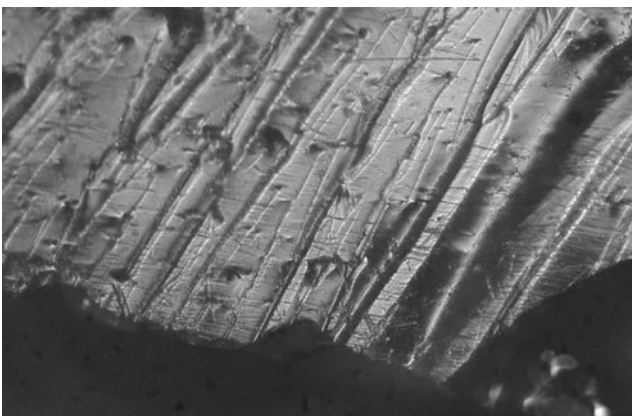


Figure 21.2. B.65, space 297, Unit 13352, A4; use-wear interpreted as cutting herbaceous plants (10X)

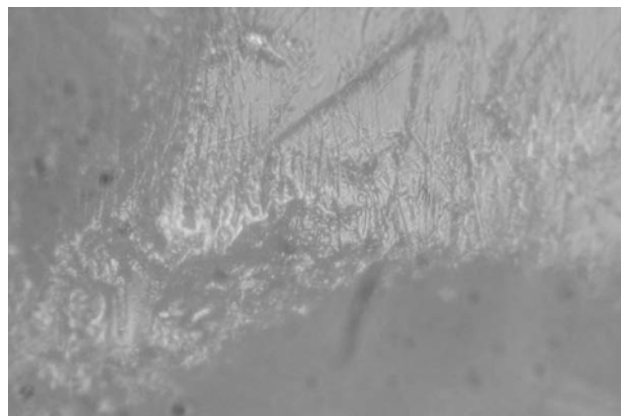


Figure 21.3. B.65, space 297, Unit 13352, A3; use-wear interpreted as scraping wood (10X)



Although preliminary, the analysis of micro-traces confirmed the observations achieved with the analysis of macro-traces. Moreover, a more detailed spectrum of materials worked was highlighted. In building 65 and in its middens artifacts own traces of the working of herbaceous plants, including cereals, of butchering (few cases) and, especially, of wood and hide.

The processing of hard animal materials is also present though not in large quantities. However, these first impressions have to be confirmed with a more accurate analysis that will be carried out in the Laboratory of Techno-Functional Analysis of Pre- and Proto-historic artifacts of the University of Rome "La Sapienza". Silicon (Provil Novo Fast, Heraeus) replicas of the surface of the tools will permit the analysis with the same accuracy than the real tools.

## 22. Preliminary results of XRF analyses conducted in 2013

Lee Drake, University of New Mexico

### Plaster Floors

The following chapter reports on the elemental analysis of plaster floor composition in space 135 of building 80 in the south excavation area using portable x-ray fluorescence instruments. All measurements were taken on instrumentation (Bruker Tracer-III SD) using a rhodium tube, silicon-drift detector, and palladium collimator. Data were taken in 50 cm increments across units (20025), (20029), feature F.3440, and the main space in Building 80. Two sets of readings were taken. Under the first set, the instruments were operated at an energy of 40 keV, and a current of 11  $\mu\text{A}$ , and made use of a filter composed of 12 mil Al/1 mil Ti. These settings were optimized to analyze trace elemental composition, including Zinc, Rubidium, Strontium, Yttrium, Zirconium, and Niobium. A second set of readings were taken at 15 keV, a current of 25  $\mu\text{A}$ , and no filter. These settings were used to identify major elemental composition, including Phosphorous, Sulfur, and Chlorine to search for potential organic residues and elements that would aid in the conservation of the site.

Two separate methods were employed to quantify the data. The first method employed a traditional empirical calibration to obtain trace elemental composition from raw photon counts. This was achieved by comparing expected values to those obtained, producing a best fit line plot which was used to quantify, in parts per million (ppm), elements such as Copper, Zinc, Thorium, Rubidium, Strontium, Yttrium, Zirconium, and Niobium. The second method employed Bayesian deconvolution of the raw spectra obtained with 9 stripping cycles from 1 - 40 keV. The latter method produced net photons, which were subsequently used to map concentrations of elements across the floor of building 80. Data was then mapped by block to infer spatial

patterns in elemental distribution.

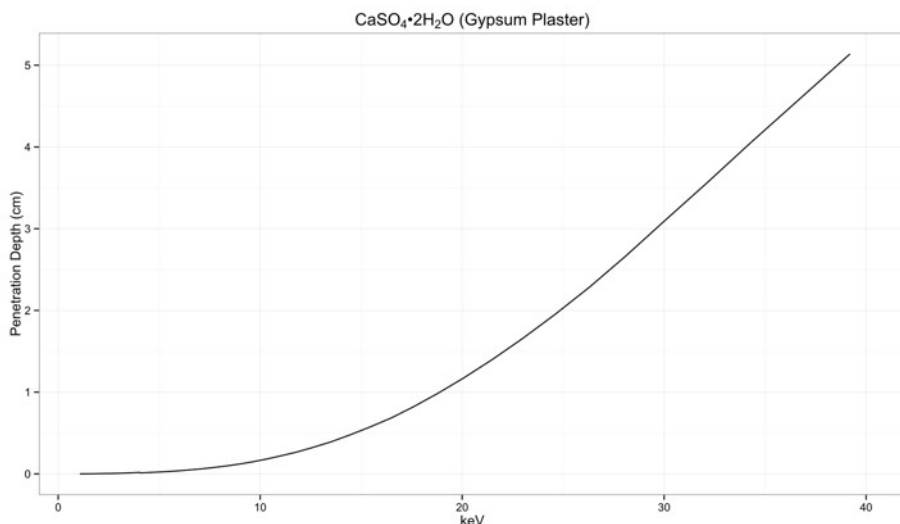


Figure 22.1. Measurement depth in gypsum plaster. Note depth ranges from 0 to 5 cm.

The study of these trace elements average together multiple plaster layers. The depth of analysis is contingent upon the energy of photons being sent into the matrix of the analyzed material, and can

be expressed as  $I/I_0 = e^{-(\mu/\rho)x}$ , where  $I$  is the quantity of photons returning from the sample,  $I_0$  is the quantity of photons entering the sample,  $\mu/\rho$  represents the mass attenuation coefficient of a given element for a particular matrix, and  $x$  represents the density of the object. Assuming a limit of 1% returning photons from a silicate matrix, the depths of analysis of elements via XRF can be depicted in Figure 22.1.

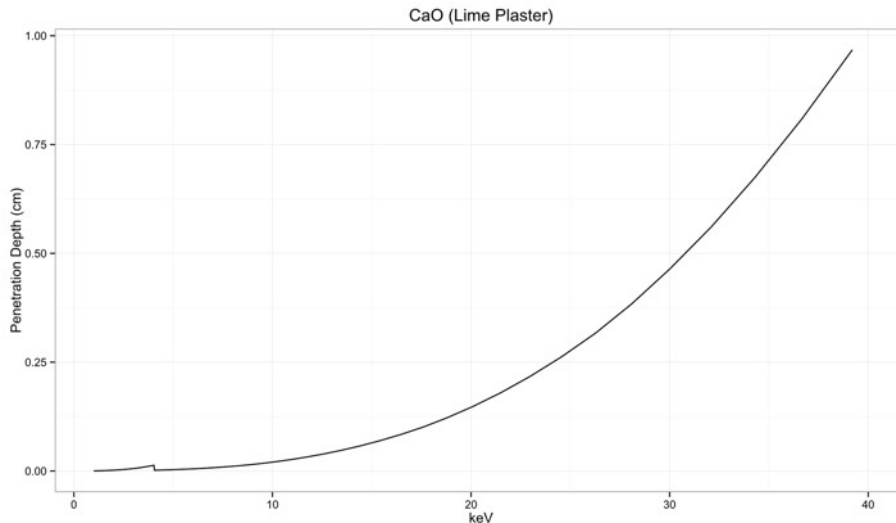


Figure 22.2. Measurement depth in lime plaster. Note depth ranges from 0 to 1 cm.

A challenge when analyzing conglomerate materials, such as sediment, using XRF is the potential variability of constituent materials within the narrow X-ray field. As a result, individual readings may be skewed and not necessarily represent the

desired sample as a whole. A preferred method to overcome the inherent inhomogeneity of sediment entails grinding the sample into a homogenized powder that is subsequently pressed into a pellet or fused into a disk, producing a uniform material for analysis. However, the present experimental application of the portable XRF in a field laboratory lacked the means to prepare the samples in such a manner.

This data was used to address:

- 1) Are plasters used in the construction of floors distinguishable from different rooms?
- 2) Can organic or mineral residues related to past human activity be identified using pXRF analysis?
- 3) Are there any conservation concerns that can be revealed using this technique?

## Results

### 1) Are plasters distinguishable from different rooms?

Plaster material from different geologic sources will be largely indistinguishable, as either calcium sulfate ( $\text{CaSO}_4$ ) or, more commonly, lime ( $\text{CaO}$ ) will be overwhelmingly present in the acquired materials. However, in theory different sources should be distinguishable due to variation in trace elemental composition resulting from LIST from source to source. With this in mind, data was mapped spatially by a small set of trace elements, including zinc (Zn), rubidium (Rb), yttrium (Y), and zirconium (Zr). Strontium (Sr), while traditionally used as a trace element in obsidian sourcing, was excluded as it is likely to vary with calcium owing to a similar valence electron structure in the outer electron shell.

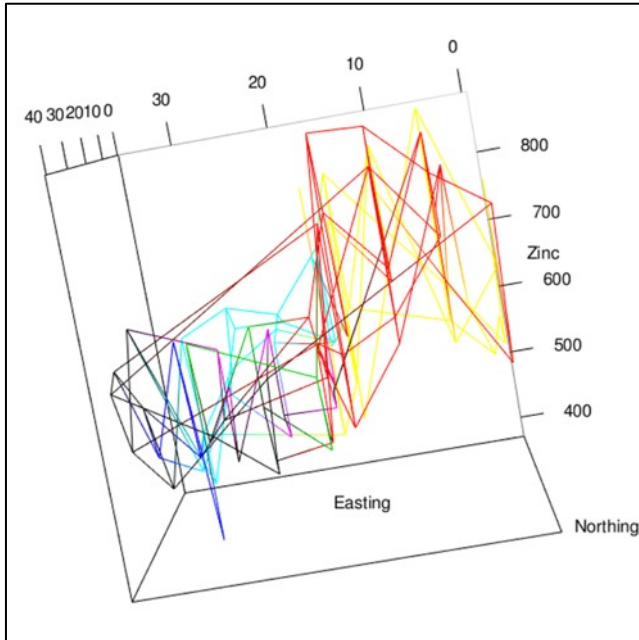


Figure 22.3. 3-dimensional model of Zinc in plaster floors used in this study. Feature F.3440 (black) and unit (20029) (light blue) indicate lower levels of Zinc relative to unit (20025) (yellow) and the main floor of building 80 (red). Measurement depth of Zinc (K alpha = 8.64 keV) is about 0.11 mm.

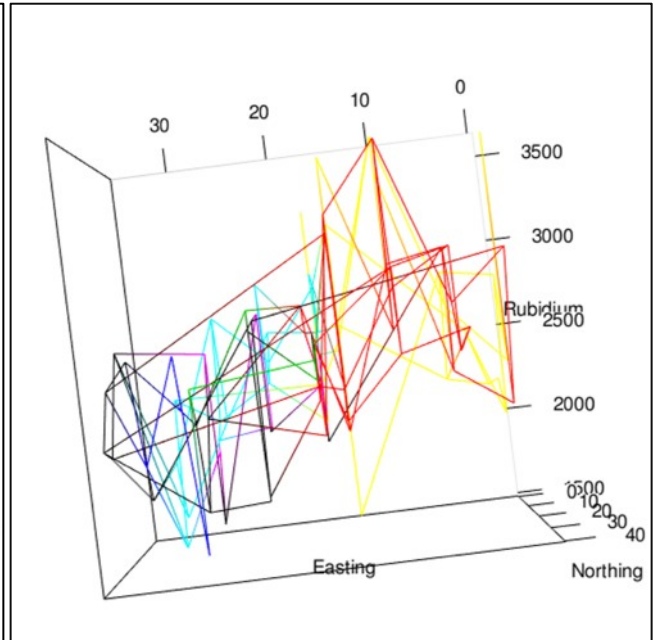


Figure 22.4. 3-dimensional model of Rubidium in plaster floors used in this study. Feature F.3440 (black) and unit (20029) (light blue) indicate lower levels of Rubidium relative to unit (20025) (yellow) and the main space of building 90 (red). Measurement depth of Rubidium (K alpha = 13.4 keV) is about 0.48 mm.

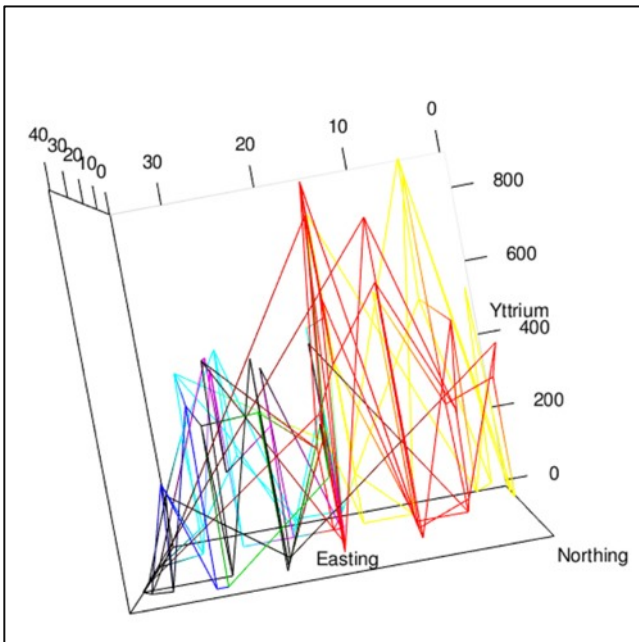


Figure 22.5. 3-dimensional model of Yttrium in plaster floors used in this study. Feature F.3440 (black) and unit (20029) (light blue) indicate lower levels of Yttrium relative to unit 0025 (yellow) and the main space of building 80 (red). Measurement depth of Yttrium (K alpha = 15.0 keV) is about 0.64 mm.

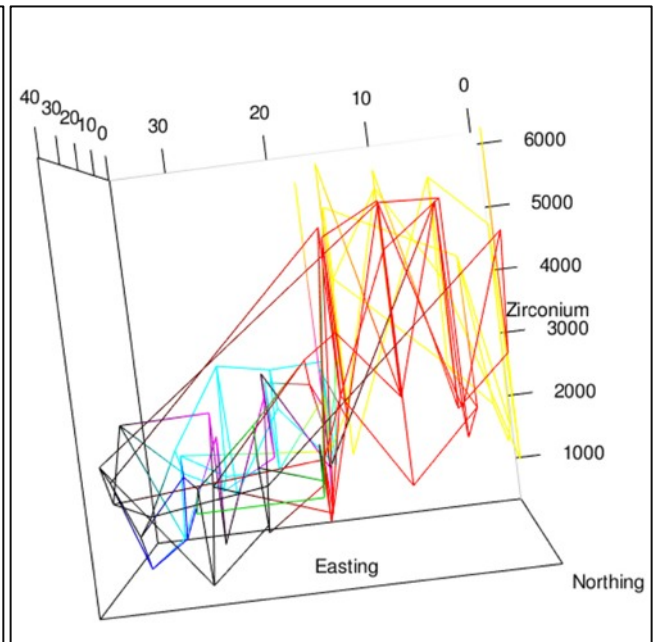


Figure 22.6. 3-dimensional model of Zirconium in plaster floors used in this study. Feature F.3440 (black) and unit (20029) (light blue) indicate lower levels of Zirconium relative to unit (20025) (yellow) and the main space of building 80 (red). Measurement depth of Zirconium (K alpha = 15.8 keV) is about 0.77 mm.

In all 4 trace elements used in this study, unit (20025) and the main floor of building 80 both show distinctly higher concentrations of Zinc, Rubidium, Yttrium, and Zirconium. The distinction is greater for Zirconium and Zinc. These results would suggest that there is a difference in the source of plaster materials used in their construction. Trace elemental differences in these elements are commonly used to source both obsidian and ceramics. Whether this indicates that unit (20029) and feature F.3440 were built at different times than unit (20025) and the main floor of building 80 cannot be determined via XRF, however there is a geochemical distinction between the plaster floors.

2) *Can organic or mineral residues related to past human activity identifiable?*

XRF analysis takes place close to the surface of materials depending on the energy needed to result in the fluorescence of different elements (See Fig. 22.5). Typically, for organic residues, either sulfur or phosphorous will be most useful. In biology, a common phrase to denote the critical elements to life is CHNOPS (Carbon, Hydrogen, Nitrogen, Oxygen, Phosphorous, and Sulfur). Of these, Phosphorous and Sulfur are detectable via XRF (the elemental limit for the SSD-Flash detector used to gather data presented in this report had a lower limit of Neon). These elements are more likely to reflect behavior as they are more likely to originate from molecules from organic origins. However, these elements could also originate from organics or minerals incorporated into the construction of the plaster floors themselves. However, as plaster represents an artificial surface, the more likely source for variance in Phosphorous and Sulfur is deposition of organic materials used by occupants of the rooms. However, a key exception exists for sulfur: at Catalhoyuk, gypsum ( $\text{CaSO}_4$ ) is used at the site, and it is possible local deposits of gypsum could explain large increases in sulfur concentrations.

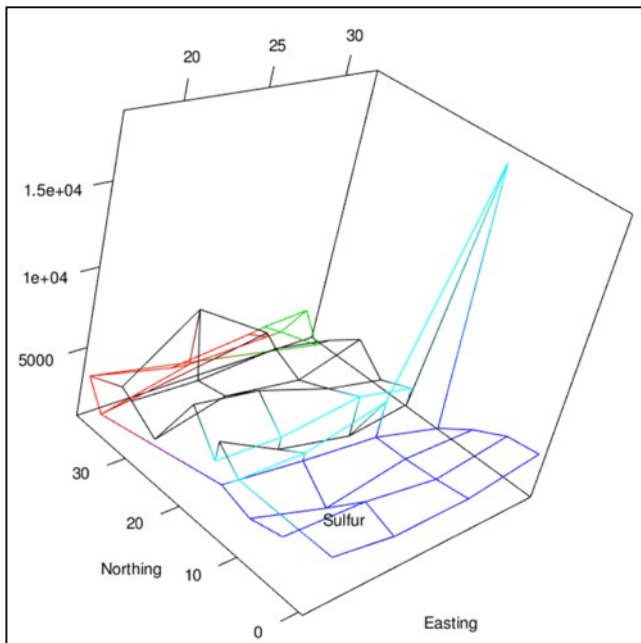


Figure 22.7. 3-dimensional model of Sulfur in plaster floors used in this study. A large, localized Sulfur deposit is identifiable in unit (20029). Measurement of sulfur (K alpha = 2.31 keV) is about 0.03 mm.

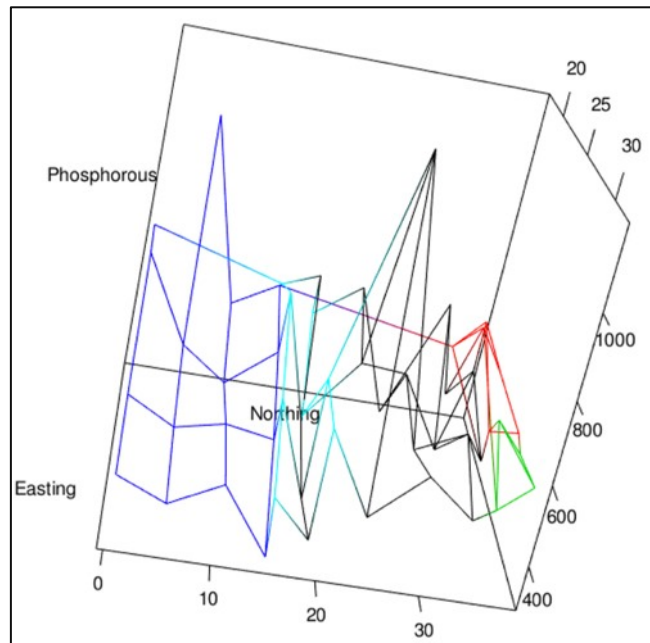


Figure 22.8. 3-dimensional model of Phosphorous in plaster floors used in this study. Two localized deposits of phosphorous are visible in both unit (20029) (blue) and feature 3340 (black). Measurement of sulfur (K alpha = 2.01 keV) is about 0.02 mm.



Portable XRF analysis in Building 80 detected two strong peaks for elements sulfur and phosphorus (Fig. 22.6 & 22.7). The sulfur peak occurs along the border of unit (20029) and feature F.3440, while the phosphorous peak is just within feature F.3440. There is a second phosphorous peak in unit (20029) in Figure 22.8.

In all cases of these potential organic concentrations, there is no evidence that either the aluminum or silica signal is being attenuated - thus indicating they are not surface deposits but rather that they are mixed into the matrix of the plaster itself. Silica, which fluoresces at 1.7 keV, only returns a signal through 0.027 of a silicate matrix (Fig. 22.1). An organic or salt material overlaying the surface of the plaster, even if only a few microns thick, would significantly attenuate the signal of silica within the plaster.

### 3) Are there any conservation concerns?

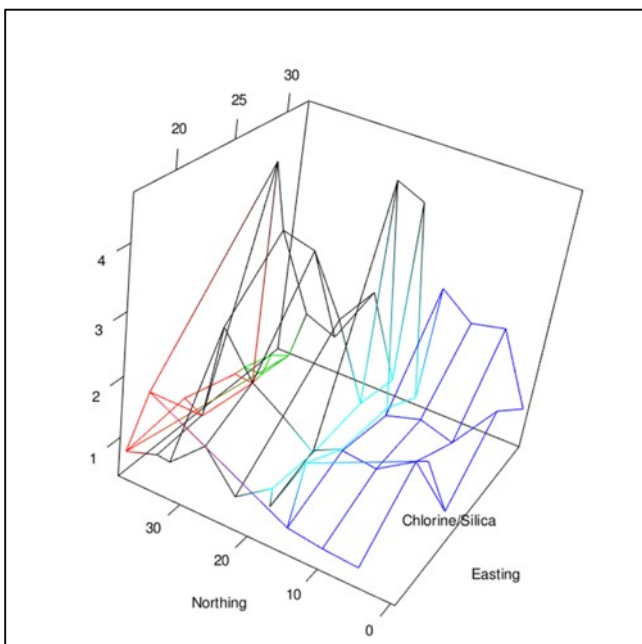


Figure 22.9. Chlorine/Silica ratio. A spike of chlorine is localized to feature F.3440 (black). Measurement depth for silica (K alpha = 1.74 keV) is about 0.01 mm and for chlorine (K alpha = 2.62 keV) is about 0.04 mm. Chlorine over the surface of silica will heavily attenuate its signal.

One of the most frequent risks to site conservation at Çatalhöyük is the buildup of salt within the site. This is most easily identified by the presence of chlorine in XRF spectra. In an earlier examination of chlorine on site, it was observed that the signal for silica was attenuated by the presence of chlorine. As such, a Cl/Si ratio was made and then examined across unit (20029) and feature F.3440.

As can be seen, there are elevated levels of chlorine present in feature F.3440. These concentrations of chlorine are potentially high enough to be of concern. Based on spectral analysis, there is still a distinct presence of silica, indicating that chlorine is not attenuating its signal. This would indicate that chlorine is not on the surface, but has instead seeped into the plaster itself. While this could be of concern, a larger region of analysis would

be necessary to determine if these results are normal. Additionally, a set of controls would be needed for reference to determine what an acceptable level of chlorine is.

### Future Prospects

XRF has traditionally been used to source obsidian, lithics, and ceramics by utilizing rare earth elements. However, with the proper measurement parameters, elements from sodium to uranium can be measured to address a diversity of archaeological questions. Elements such as

chlorine (particularly when radioed against silica) can indicate the presence of salts, which in some contexts can represent a threat to long-term preservation of archaeological structures. Phosphorous and sulfur can indicate the presence of organic residues present on an occupational surface, or even potentially within a ceramic vessel. These applications of XRF differ considerably from their traditional use in sourcing as they

- a) do not assume homogeneity, but rather assess heterogeneity
- b) utilize a wider group of elements to inform archaeological conclusions
- c) do not quantify data (as interpretation relies upon distinguishable layers)

These factors must be taken in to consideration when making interpretations of photon data. An increase in chlorine does not necessarily reflect an increase of chlorine in parts-per-million or weight %. When contrasted with changes in the photon signal of silica, this can indicate the presence of a discrete layer of chloride, likely bound with sodium. This heterogenous nature of reality precludes attempts to quantify this data directly. However, using semi-quantitative data analysis, it can be possibly not only to use XRF without calibrations but to identify changes in surface deposits. Whether the goal is to identify organic residues or potential conservation concerns, heterogenous materials analysis is not a weakness, but rather a strength, of non-destructive XRF analysis.

## **Ceramics Analysis**

In the summer of 2013, multiple ceramics were analyzed to look for the potential of organic residue. This was done primarily as a test to see if organic residues could be identified through x-ray fluorescence (XRF). The hypothesis was that organic residues could be indicated via Sulfur and Phosphorous. In biology, the core elements needed for life are Carbon, Hydrogen, Nitrogen, Oxygen, Phosphorous and Sulfur. Without these elements, not even bacteria could survive. With XRF, it is possible to identify both Sulphur and Phosphorous, as the lightest element currently detectable with handheld XRF is Neon.

The hypothesis in this study was that should organic residues be present, they would block the signal of silica, as they should be in the highest concentrations on the surface. To understand the rationale of this hypothesis, a little bit of physics explanation is needed.

Elements fluoresce at characteristic energies. For example, the k-alpha peak of Silica fluoresces at 1.7 keV, Phosphorous fluoresces at 2.01 keV, and Sulfur fluoresces at 2.31 keV. As the energy of fluorescence increases, the measurement depth increases as well. This is conditional upon the density of the matrix and the mass attenuation coefficient of each element. These can be expressed by the following formula:

$$I/I_0 = e^{[-(\mu/\rho)x]}$$

where  $I$  is the quantity of photons returning from the sample,  $I_0$  is the quantity of photons entering the sample,  $\mu/\rho$  represents the mass attenuation coefficient of a given element for a

particular matrix, and  $x$  represents the density of the object. Assuming a limit of 1% returning photons from a silicate matrix, the depths of analysis of key elements should be no more than 0.025 mm. Thus, data comes from the very surface of the ceramic. Any residue on the surface will easily attenuate the signal of Silica, Phosphorous, and Sulfur.

### Methods

Data was taken in two sets of conditions. First, a number of ceramics were analyzed at 40 keV, a current of 30  $\mu\text{A}$  and no filter in open air. A second set of ceramics were analyzed at 15 keV, a current of 25  $\mu\text{A}$  and no filter in open air. The latter set of measurements are closer to the ideal for measuring light elements, but as data was to be converted into a ratio, the effect of the increased optimization was minimal.

Data was then processed using Bayesian deconvolution in Spectra 7.4.0.0 with 10 stripping cycles for 1 - 40 keV for the first data set, and 1-15 keV for the seconds. Following this treatment, the concentrations of phosphorous and sulfur were summed and divided by silica. A test measurement was run at 40 keV, in which cheese was added to a sample cup and measured as a proof-of-concept, to establish if the method could predict a known value.

### Results

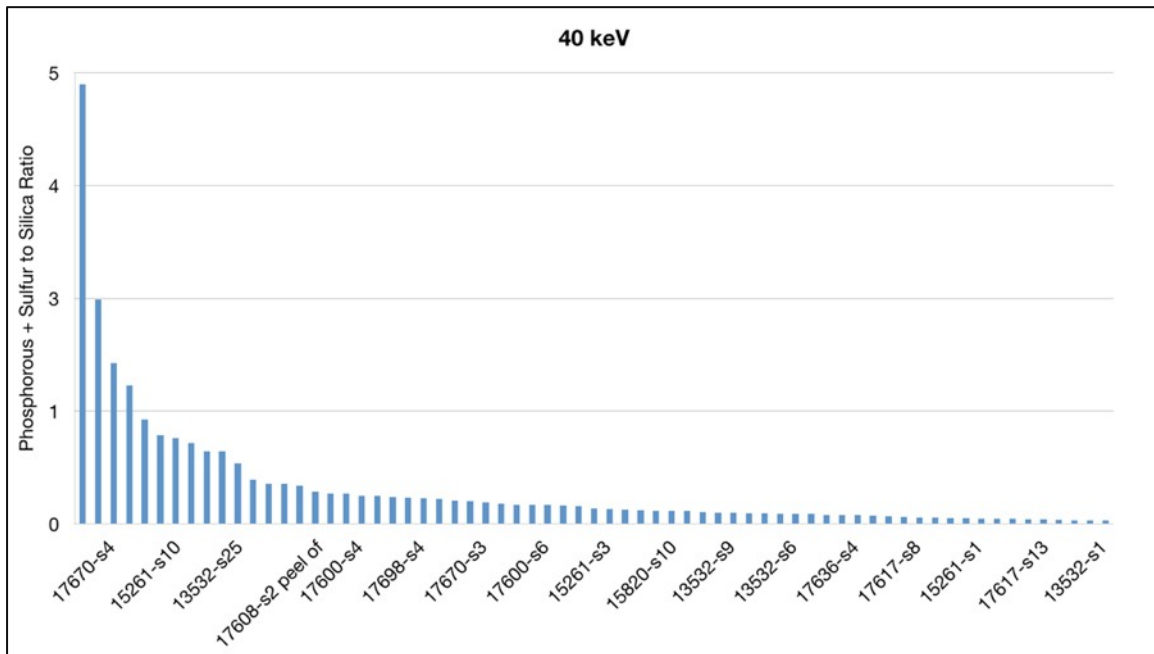


Figure 22.10. Phosphorous + Sulfur to Silica ratios for data taken at 40 keV.

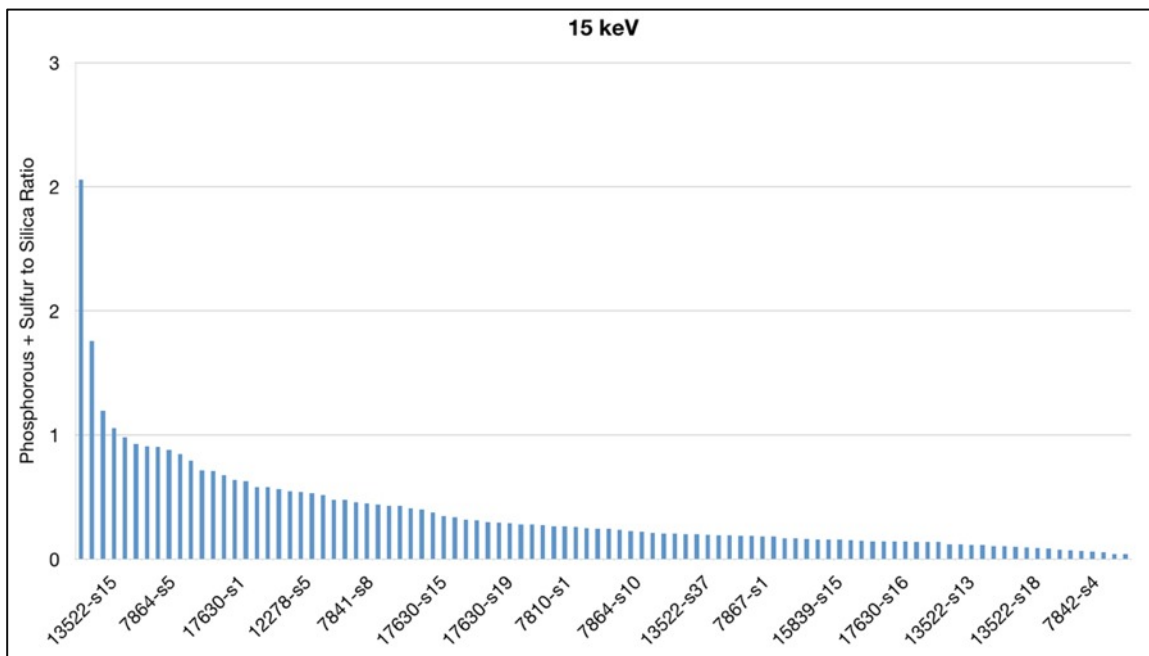


Figure 22.11. Phosphorous + Sulfur to Silica ratios for data taken at 15 keV.

The control sample, in which cheese was added to a ceramic, did indeed produce some of the highest Phosphorous + Sulfure to Silica ratios, indicating that the underlying method shows potential. However, archaeological ceramics will be different in that residues will be much more evenly spread across a surface and within the sub-surface of the ceramic.

A number of ceramics do show high Phosphorous and Sulfur relative to Silica. However, determining a threshold for likeliness of an organic residue is still somewhat difficult. Ratios above 100% may indicate high likelihoods, whereas ratios above 20% may indicate a possibility. It is important to note that the occurrence of Phosphorous and Sulfur is not determinative for organic material - phosphates and sulfates are common in many soils. However, the decreasing concentrations of Silica do indicate that a substance is attenuating its fluorescence. As such, the combination of both lines of evidence at least may serve as an empirical method of selecting samples potentially more likely to indicate organic residues.

## Obsidian

Obsidian artifacts were analyzed at 40 keV with a current of 30  $\mu$ A and a 12 mil Al, 1 mil Ti and 6 mil Cu filter in open air for 30-60 seconds on a Bruker Tracer III SD system. Results were quantified using an empirical reference set of 40 standards developed by MURR in partnership with Bruker Elemental. These data were normalized to background reflection of the spectra between 9.8 - 10.35 keV. These data were used to generate multiple linear models, following the Lucas-Tooth equation:

$$C_i = r_0 + I_i[r_i + \sum(r_{in}I_n)]$$

In which  $C_i$  represents the concentrate of a given element of the sample in weight % or ppm,  $r_0$  is the intercept/constant,  $r_i$  is the slope of photons for element  $i$ ,  $r_{in}$  is the slope of photons for element  $n$  that influence the fluorescence of element  $i$ ,  $I_i$  is the quantity of photons for element  $i$ , and  $I_n$  is the quantity of photons for element  $n$ .

A second set of data was obtained via a laboratory XRF unit housed in McMaster University. This was quantified via internal procedures, and was used to compare with the handheld XRF unit.

## Results

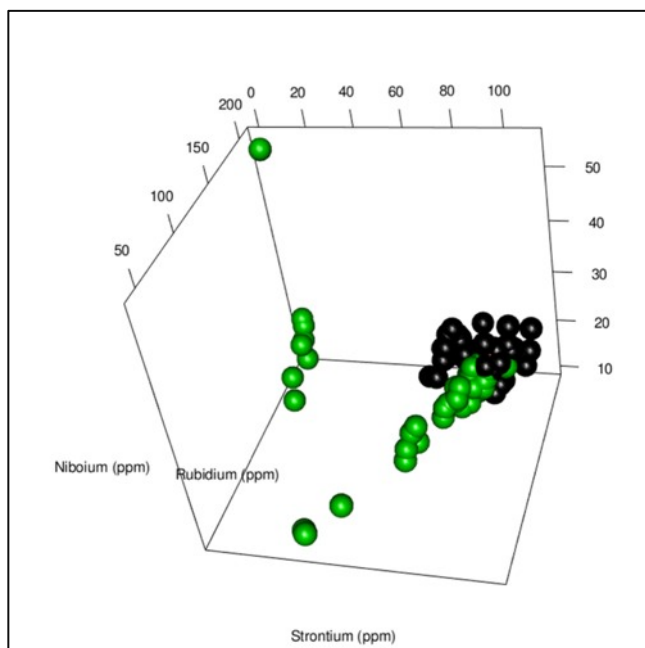


Figure 22.12. Comparison of Tracer III SD (green) and laboratory (black) XRF results in a trivariate plot including rubidium, strontium, and niobium. While multiple sources are present in this data set, the laboratory and handheld units appear to have correctly identified obsidian from a common source.

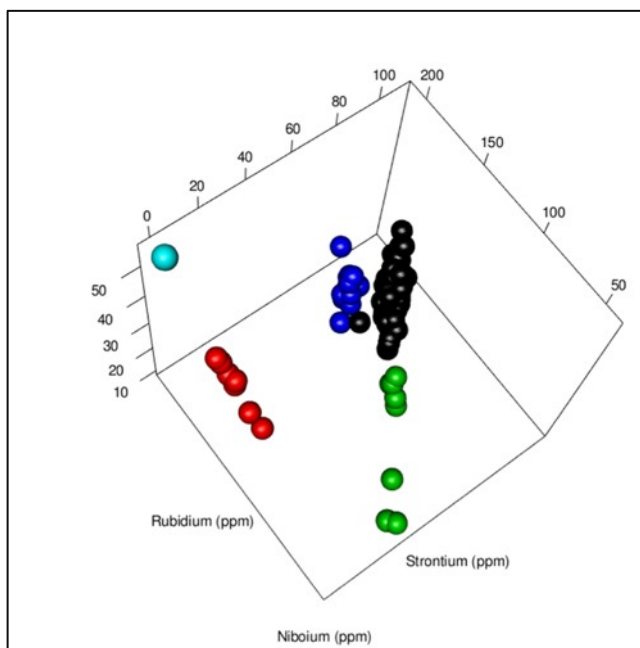


Figure 22.13. Trivariate plot including rubidium, strontium, and niobium, colored by a hypothetical set of groups as defined by k-means cluster analysis.

The Tracer III-SD largely replicated the results of the laboratory ED-XRF unit, as noted in 3d plot in Figure 22.11. Both instruments largely agree on the quantity of Rubidium, Strontium, and Niobium in at least one source. As such, there is no reason to expect that additional obsidian samples analyzed deviate from actual chemical concentrations.

Figure 22.12 illustrates the different sources that appear to be indicated by XRF analysis of obsidian in the summer of 2013. Additional samples analyzed with the handheld XRF indicate at least 4 new sources in addition to those obsidian samples analyzed by the laboratory unit.



## Appendix: Tables

Table 22.1. 40 keV data, organized from highest to lowest Phosphorous + Sulfur to Silica ratio

Name	P K12	S K12	Si K12	[P +S]/Si
17670-s4	1549	107740	22437	487.09%
cheese experiment	1768	616	959	248.59%
15820-s2 residue	15991	2141	10179	178.13%
17670-s20	22693	11415	22176	153.81%
15261-s10	547	38262	33599	115.51%
13532-s4	1377	22843	24618	98.38%
17670-s1	448	23866	25674	94.70%
15261-s9	768	22550	26059	89.48%
13532-s25	774	22538	28907	80.64%
17608-s3	506	30809	38983	80.33%
17608-s1	1543	11673	19685	67.14%
17608-s6	9257	8786	36851	48.96%
17608-s2 peel of	759	9081	21990	44.75%
17608-s2 surface	636	16952	39457	44.58%
17697-s4	431	11611	28289	42.57%
17636-s6	8503	2953	32145	35.64%
17600-s4	1570	12787	42338	33.91%
17670-s6	2956	2152	15188	33.63%
15820 -s2 outer surface	2082	13502	50227	31.03%
17670-s24	1388	8055	30501	30.96%
17698-s4	2574	5478	27284	29.51%
17670-s7	7265	7129	49263	29.22%
17697-s12	983	7734	30354	28.72%
17670-s2	1177	1050	8011	27.80%
17670-s3	617	9005	37560	25.62%
13532-s8	681	8334	35786	25.19%
mixed soil cheese	482	207	2932	23.50%
17600-s7	2322	5126	33426	22.28%
17600-s6	1694	7576	43359	21.38%
15803-s9	624	7244	37029	21.25%
17608-s5	741	3005	17746	21.11%
15232-s2	6320	727	34783	20.26%
15261-s3	3906	2307	31060	20.00%
17809-s1	2483	1799	25464	16.82%
17636-s23	1898	269	12922	16.77%
13532-s24	2746	2312	31903	15.85%
15820-s10	1328	692	13071	15.45%
17617-s1	644	5648	42631	14.76%
15261-s4	612	5634	43145	14.48%

17670-s26	707	2597	23078	14.32%
13532-s9	2397	3166	41455	13.42%
13532-s3	455	4311	37648	12.66%
13532-s10	1507	2580	32675	12.51%
17697-s10	517	1023	12741	12.09%
13532-s6	1709	4000	48357	11.81%
13532-s5	963	2362	29538	11.26%
13532-s29	2283	2568	43906	11.05%
13532-s7	1035	1599	24037	10.96%
17636-s4	1425	2396	38543	9.91%
17617-s17	2319	1263	36479	9.82%
17697-s3	658	3290	40633	9.72%
17617-s18	1317	1490	31234	8.99%
17617-s8	2240	1168	39043	8.73%
15803-s1	325	1068	17666	7.89%
13532-s2	702	1892	36241	7.16%
13532-s30	418	1852	32315	7.02%
15261-s1	863	1219	31854	6.54%
15803-s2	1064	1216	37124	6.14%
17809-s2	256	968	20764	5.89%
17636-s2	585	438	17792	5.75%
17617-s13	1247	1200	43912	5.57%
17809-s3	584	1110	32209	5.26%
13532-s26	662	547	23282	5.19%
17636-s3	852	865	40917	4.20%
13532-s1	1002	779	44713	3.98%
Sediment Cup	447	116	14541	3.87%
13532-s27	839	998	48691	3.77%

Table 22.2. 15 keV data, organized from highest to lowest Phosphorous + Sulfur to Silica ratio

Names	P K12	S K12	Si K12	[P +S]/Si
13522-s15	11327	3696	6554	229.22%
13531-s2	7385	3344	8133	131.92%
13522-s10	4835	1895	7520	89.49%
13570-s13	203	7821	10147	79.08%
7842-s2 reside	4130	549	6355	73.63%
7842-s2 outer surface	4368	7049	16372	69.73%
7864-s5	1969	3669	8269	68.18%
13522-s100	844	2282	4607	67.85%
7864-s3	6631	2966	14539	66.01%
17630-s10	1209	3010	6639	63.55%
12278-s6	786	6754	12702	59.36%
13570-s4	1838	5424	13513	53.74%

17630-s1	3558	5044	16150	53.26%
7867-s11	514	9125	19058	50.58%
13570-s7	490	7912	17521	47.95%
7895-s1	317	6892	15334	47.01%
7864-s1	499	4347	11128	43.55%
13532 -s2 outer surface	479	7545	18444	43.50%
12278-s5	1600	3557	12191	42.30%
13522-s1	585	7339	19426	40.79%
13522-s106	269	4963	12949	40.40%
13522-s28	2015	4492	16341	39.82%
7867-s5	752	3528	11020	38.84%
13522-s138	489	5862	17744	35.79%
7841-s8	383	5496	16441	35.76%
15226-s2	804	2903	10832	34.22%
17630-s9	251	2476	8098	33.67%
13570-s19	1746	2926	14235	32.82%
7841-s3	356	5538	18264	32.27%
13522-s38	1001	4251	16340	32.14%
17630-s15	433	4718	16877	30.52%
13531-s1	322	3408	12398	30.09%
13522-s6	704	3700	15705	28.04%
17630-s7	640	1765	9209	26.12%
13570-s2	672	2741	13439	25.40%
17630-s8	344	4049	18528	23.71%
17630-s19	664	3730	18859	23.30%
13509-s3	349	4350	20891	22.49%
13522-s9	1041	2745	17218	21.99%
13027-s2	187	1784	9145	21.55%
15224-s2	223	1598	8736	20.84%
7895-s3	842	2810	17592	20.76%
7810-s1	974	2678	17828	20.48%
7841-s1acorr	321	3778	20715	19.79%
13522-s5	402	1940	11840	19.78%
7841-s2	267	2306	13319	19.32%
17630-s3	1742	1356	16645	18.61%
17630-s30	2083	1167	17755	18.30%
7864-s10	361	2530	15834	18.26%
13522-s14	503	2189	15185	17.73%
13522-s40	1001	1517	14772	17.05%
7867-s9	379	2831	19448	16.51%
17630-s2	377	1063	9097	15.83%
7864-s2	1845	878	17474	15.58%
13522-s37	518	2613	20351	15.38%
13522-s23	1000	1709	18113	14.96%

7841-s12	227	2652	19280	14.93%
11511-s2	386	2371	18886	14.60%
17630-s11	452	1520	13696	14.40%
17630-s24	685	1246	13500	14.30%
7867-s1	288	1725	14353	14.02%
7841-s13	435	1783	15888	13.96%
7841-s1	904	1019	14128	13.61%
12278-s4	328	1461	13283	13.47%
17630-s5	811	595	11343	12.40%
13522-s41	352	1339	13649	12.39%
15839-s15	998	349	11100	12.14%
17630-s6	345	1626	16474	11.96%
7810-s5	368	1875	18996	11.81%
17684-s1	611	1607	18945	11.71%
13522-s76	677	1217	16686	11.35%
12278-s7	337	998	11915	11.20%
17630-s16	167	561	6724	10.83%
7867-s3	279	1284	14505	10.78%
15839-s12	265	1235	14173	10.58%
7842-s1	778	737	14354	10.55%
17630-s12	793	772	14919	10.49%
13528-s2	430	688	10859	10.30%
13522-s13	302	833	11075	10.25%
7841-s95	224	327	6168	8.93%
7810-s2	683	149	9524	8.74%
7841-s7	464	795	14544	8.66%
13522-s12	387	616	11963	8.38%
17630-s20	373	1224	20240	7.89%
13522-s18	296	1303	20903	7.65%
13509-s4	267	697	12809	7.53%
7841-s6	614	549	16459	7.07%
12200-s4	390	320	10805	6.57%
17630-s4	292	321	9725	6.30%
7841-s5	418	401	14746	5.55%
7842-s4	249	516	15019	5.09%
7810-s3	450	376	16352	5.05%
7843-s6	471	468	20334	4.62%
12219-s4	340	366	16911	4.17%
13528-s6	300	285	18275	3.20%
15839-s2	371	152	18000	2.91%

Table 22.3. Trace elements of the most common elements used in obsidian sourcing.

Sample ID	Device	RbKa1	SrKa1	Y Ka1	ZrKa1	NbKa1
11779 s1	Tracer	154.42	91.92	16.85	132.43	19.48
11779 s2	Tracer	162.31	92.26	22.38	138.46	20.80
11779 s3	Tracer	138.21	13.17	14.69	68.24	16.27
11779 s4	Tracer	104.90	66.12	14.67	92.75	13.34
11779 s5	Tracer	167.65	94.48	21.97	142.54	20.50
12000 s5	Tracer	150.39	88.27	20.44	128.20	18.92
12200 s1	Tracer	69.59	46.10	8.60	66.77	11.80
12200 s2	Tracer	154.79	84.37	20.51	127.51	17.99
12200 s3	Tracer	167.31	90.41	21.33	136.57	19.69
12200 s4	Tracer	147.83	11.45	19.08	71.32	19.06
12205 s1	Tracer	163.46	92.15	20.01	136.44	20.38
12205 s2	Tracer	107.63	66.61	13.02	98.85	15.10
12205 s3	Tracer	162.48	93.16	22.36	132.51	21.42
12205 s4	Tracer	162.06	89.09	18.85	135.37	21.21
12205 s5	Tracer	149.68	82.50	21.08	124.28	18.69
13027 s1	Tracer	115.78	70.05	16.18	103.12	18.10
13027 s2	Tracer	147.84	81.43	16.47	127.19	19.29
13027 s3	Tracer	171.95	12.33	19.11	81.57	21.97
13027 s4	Tracer	167.76	13.59	21.23	85.18	18.83
13092 s1	Tracer	169.30	92.27	22.09	143.57	20.53
13092 s2	Tracer	46.40	36.25	5.67	46.72	11.49
13092 s3	Tracer	165.99	99.60	23.27	136.51	20.15
13522 s1	Tracer	159.48	91.28	21.40	138.02	18.50
13522 s2	Tracer	139.64	82.95	20.93	117.45	18.81
13522 s3	Tracer	156.46	87.62	18.86	129.70	18.06
13522 s4	Tracer	145.08	83.72	20.97	128.68	20.01
13522 s5	Tracer	159.47	85.03	21.29	134.88	19.46
13522 s6	Tracer	157.19	93.09	21.83	133.46	20.64
13522 s7	Tracer	156.12	86.58	21.69	137.67	20.15
13532 bingol	Tracer	204.82	1.51	114.46	975.03	54.13
13532 s2	Tracer	180.83	10.91	25.27	81.89	24.71
13532 s3	Tracer	168.52	92.26	21.22	142.44	20.85
13532 s4	Tracer	157.05	87.33	18.96	135.42	21.52
13532 s5	Tracer	161.15	90.12	17.95	133.15	20.74
13532 x30	Tracer	137.17	77.98	16.69	117.52	17.23
13570 s1	Tracer	156.75	89.29	19.91	126.71	17.49
13570 s2	Tracer	161.65	86.80	22.38	135.81	18.02
13570 s3	Tracer	155.91	92.65	21.11	138.45	19.65
13570 s4	Tracer	153.46	91.71	24.08	133.41	18.26
13570 s5	Tracer	155.12	89.72	18.54	129.94	17.47
17600 s1	Tracer	161.76	88.47	24.30	138.66	19.80
17600 s10	Tracer	163.60	90.84	23.21	135.64	16.91



17600 s2	Tracer	162.45	90.93	22.96	137.01	18.16
17600 s3	Tracer	114.52	68.02	12.14	102.04	16.92
17600 s4	Tracer	154.02	85.14	22.47	127.72	16.01
17600 s5	Tracer	138.92	79.24	20.75	121.49	17.74
17600 s6	Tracer	145.24	83.56	17.37	127.80	15.81
17600 s7	Tracer	146.28	82.99	15.30	126.31	16.57
17600 s8	Tracer	153.58	83.81	19.11	128.54	16.71
17600 s9	Tracer	156.57	88.51	23.50	138.84	16.59
17809 s1	Tracer	117.61	69.46	14.69	97.65	14.32
17809 s2	Tracer	148.81	86.23	16.03	121.93	15.97
17809 s3	Tracer	165.53	12.96	21.80	81.94	22.30
17809 s4	Tracer	147.55	82.01	18.77	123.45	18.06
17812 s1	Tracer	158.24	90.60	21.85	134.59	19.12
17812 s2	Tracer	143.27	82.08	19.74	123.34	17.47
17812 s3	Tracer	178.34	11.75	20.17	80.66	23.73
17812 s4	Tracer	51.30	34.27	7.82	53.16	10.70
17812 s5	Tracer	135.96	77.11	19.85	120.22	15.50
20698 rb	Red and Black	165.41	93.11	21.93	139.32	22.13
949.00	Tracer	155.06	90.61	21.84	136.27	17.64
	MacMaster	165.00	93.00	22.00	139.00	22.00
Nenezi Dag g (.006-.010)	MacMaster	168.00	96.00	20.00	149.00	23.00
Nenezi Dag g (.016-.020)	MacMaster	157.00	93.00	20.00	137.00	22.00
Nenezi Dag l .001	MacMaster	172.00	97.00	23.00	146.00	20.00
Nenezi Dag l .002	MacMaster	172.00	98.00	20.00	148.00	20.00
Nenezi Dag l .003	MacMaster	174.00	100.00	21.00	147.00	23.00
Nenezi Dag l .004	MacMaster	160.00	93.00	19.00	141.00	26.00
Nenezi Dag l .005	MacMaster	186.00	108.00	22.00	153.00	24.00
Nenezi Dag l .006	MacMaster	181.00	103.00	28.00	156.00	20.00
Nenezi Dag l .007	MacMaster	167.00	94.00	18.00	144.00	17.00
Nenezi Dag l .008	MacMaster	159.00	95.00	24.00	141.00	16.00
Nenezi Dag l .009	MacMaster	183.00	107.00	23.00	155.00	20.00
Nenezi Dag l .010	MacMaster	164.00	93.00	19.00	134.00	21.00
Nenezi Dag l .011	MacMaster	173.00	101.00	21.00	148.00	27.00
Nenezi Dag l .012	MacMaster	167.00	99.00	24.00	138.00	20.00
Nenezi Dag l .013	MacMaster	161.00	98.00	25.00	139.00	22.00
Nenezi Dag l .014	MacMaster	171.00	98.00	18.00	145.00	21.00
Nenezi Dag l .015	MacMaster	182.00	105.00	22.00	148.00	17.00
Nenezi Dag l .016	MacMaster	173.00	100.00	22.00	154.00	20.00
Nenezi Dag l .017	MacMaster	170.00	95.00	20.00	145.00	23.00
Nenezi Dag l .018	MacMaster	170.00	97.00	24.00	150.00	22.00
Nenezi Dag l .019	MacMaster	173.00	101.00	19.00	149.00	22.00
Nenezi Dag l .020	MacMaster	159.00	95.00	18.00	136.00	21.00
Nenezi Dag l .021	MacMaster	177.00	101.00	18.00	148.00	21.00

<b>Nenezi Dag I .022</b>	MacMaster	180.00	101.00	20.00	150.00	21.00
<b>Nenezi Dag I .023</b>	MacMaster	161.00	90.00	21.00	141.00	20.00
<b>Nenezi Dag I .024</b>	MacMaster	167.00	98.00	21.00	141.00	17.00
<b>Nenezi Dag I .025</b>	MacMaster	163.00	97.00	23.00	138.00	17.00
<b>Gollu Dag I .001</b>	MacMaster	157.00	72.00	21.00	125.00	19.00
<b>Gollu Dag I .002</b>	MacMaster	180.00	79.00	21.00	137.00	22.00
<b>Gollu Dag I .003</b>	MacMaster	169.00	73.00	19.00	128.00	20.00
<b>Gollu Dag I .004</b>	MacMaster	183.00	79.00	23.00	133.00	21.00
<b>Gollu Dag I .005</b>	MacMaster	172.00	74.00	20.00	132.00	22.00
<b>Gollu Dag I .006</b>	MacMaster	176.00	75.00	20.00	133.00	24.00
<b>Gollu Dag I .007</b>	MacMaster	166.00	67.00	19.00	126.00	17.00
<b>Gollu Dag I .008</b>	MacMaster	176.00	72.00	19.00	128.00	21.00
<b>Gollu Dag I .009</b>	MacMaster	203.00	85.00	20.00	147.00	21.00
<b>Gollu Dag I .010</b>	MacMaster	182.00	79.00	25.00	149.00	18.00
<b>Gollu Dag I .011</b>	MacMaster	177.00	77.00	21.00	134.00	25.00
<b>Gollu Dag I .012</b>	MacMaster	176.00	81.00	19.00	131.00	20.00
<b>Gollu Dag I .013</b>	MacMaster	182.00	79.00	22.00	134.00	22.00
<b>Gollu Dag I .014</b>	MacMaster	181.00	78.00	22.00	134.00	23.00
<b>Gollu Dag I .015</b>	MacMaster	176.00	73.00	19.00	130.00	19.00

## 23. On-site tablet recording

James Taylor<sup>1</sup> & Justine Issavi<sup>2</sup>

<sup>1</sup>University of York, <sup>2</sup>Stanford University

### Overview

As part of a larger goal to fully digitize the recording process at Çatalhöyük, Buildings 80 and 118-in the South area-were a part of a pilot project aiming to digitize the planning process. While part of this workflow was developed in the months leading up to the 2013 field season, the details were ironed out on site with the additional help and input of Camilla Mazzucato and Nicolò Dell'Unto.

The hardware used included the windows-based Microsoft Surface Pro tablet and the site photography equipment (camera and monopod). The software used included the full ArcGIS 10.1 suite, as well as Perspective Rectifier. Our hardware and software choices were made in light of previous project practices, as well as future project goals. For example, by choosing a windows-based tablet, we tried to ensure maximum compatibility with the project's access-based database. Furthermore, it allowed us to run the full suite of ArcGIS software (which is used to manage the site geodatabase), as well as the Microsoft Office Professional Suite. Another goal was to ensure that the tablet allowed detailed drawings. The Surface Pro accommodated this need and was still robust enough to be used in field conditions.

### Workflow

In developing this workflow, one of our main goals was ensuring no data would be lost in the transition from paper to digital. Here, we will present an abridged version of the workflow that was developed and used throughout the 2013 field season.

- Setting up a Mini Grid in Building
  - Before the beginning of the excavation, numbered, semi-permanent targets (2x2cm) should be placed in the excavation area at a 1x1m scale.
  - These targets will then be picked up by the total station and saved into a shapefile to be used as control points.
- Taking Photos
  - Take photos using site camera and monopod and keep distortion to a minimum with at least 4 well-dispersed targets.
  - Photos will then be transferred onto tablet using a USB cable.
- Ortho-rectifying/Georeferencing Photos
  - Ortho-rectify images using ArcMap georeferencing tools and process.
  - Save rectified version in tiff format to be used in digitizing.
- Digitizing in ArcMap
  - Here the digitization process can begin using the Editor toolbar and editing shapefiles.

- There will be two sets of shapefiles that can be edited in the prepared mxd. One set will be used for multi-context plans (such as pre-excavation, post-excavation, and phase plans) and another set for single context plans.
  - Single context plans have four types of shapefiles:
    - Base Unit Polygon
    - Unit Detail Lines
    - Annotations
    - X-finds
    - Elevations
  - Each shapefile will have a number of preset attribute fields that will need to be filled in by the excavator as they are digitized. They are described below:

#### Base Unit Polygon

<i>Unit number</i>	12345
<i>Excavated</i>	YES/NO/PARTIAL
<i>Notes</i>	Unit interpretation
<i>Source</i>	File name of photo source

#### Unit detail lines attribute fields (for symbols see crib sheet: drawing conventions):

<i>Type</i>	Limit of excavation –LOE Extent of unit-EU Truncation-TR Uncertain limit-UL Slope-SL Inverted slope-IS Break of slope-BS Line of section LS
<i>Unit number</i>	12345
<i>Excavated</i>	YES/NO/PARTIAL
<i>Highest Z</i>	1234.5

#### Annotations attribute fields:

<i>Unit number</i>	12345
<i>Notes</i>	Label

#### X-finds attribute fields:

<i>Unit number</i>	12345
<i>Type</i>	BEAD/BLADE/WORKED BONE, ETC.
<i>X-find number</i>	x1, x2, x3, etc.
<i>X</i>	123.11
<i>Y</i>	123.11
<i>Z</i>	1234.11

#### Elevation attribute fields:

<i>Unit number</i>	12345
<i>Elevation</i>	1234.12

- Unlike single context plans, multi-context plans will have a graphics number assigned to them (just as you would a hand-drawn map).
- Multi-context plans have three types of shapefiles:
  - Multiplans details
  - Multiplans elevations
  - Multiplans annotations
- Each shapefile will have a number of preset attribute fields that will need to be filled in by the excavator as they are digitized. They are described below:

Multiplans details:

<i>Type</i>	Limit of excavation –LOE Extent of unit-EU Truncation-TR Uncertain limit-UL Slope-SL Inverted slope-IS Break of slope-BS Line of section LS
<i>Unit number</i>	12345
<i>Graphic number</i>	13/400

Multiplans elevations:

<i>Graphic number</i>	13/400
<i>Elevation</i>	1234.12

Multiplans annotations:

<i>Graphic number</i>	13/400
<i>Notes</i>	Label

- Post excavation plans & section/elevation drawings
  - Orthophotos obtained from 3D models created through dense stereo matching techniques can be used for detailed post excavation plans and section drawings. The presence of an archived 3D model associated with the aforementioned plans will also be a useful addition to the spatial dataset.
  - Utilizing the ArcGIS 2.5D functionality and digitize section/elevation drawings using ArcScene and a 3D model.
  
- All data is saved and backed up daily.



Each team data-package will contain the following documents:

Item	File Type	Example File Name	Reason for Inclusion
Source photo	.raw	img123	Archival copy
Source photo	.jpg	18080	Working copy-for rectification
Source photo	.tiff	18080Rec	Working copy-for digitizing
Back-up SHP	.shp	unit_details, etc.	Archival/back-up
SHP files	.shp	unit_details, etc.	Working copy
ArcMap file	.mxd	B.80_plans_2013	Working station/plat
ArcScene file	.sxd	B.80_plans_2013	Working station 3d data
Styles	.style	Tablet_styles	Standardized SHP symbols
TotalSt.Data	.shp	B.80_targets	Building control points
Previous data	various	Archive_Report_2012	Useful information
Geodatabase	.mdb	site_geodatabase_date	Useful information
Working 3D model	.obj	B80_preexc_model	Used for section/elevation drawings; to create orthogonal photos

### Results and Future Goals

Overall, the results of this pilot project have been successful and satisfactory. A number of small issues (such as a stylus malfunction) were encountered and overcome in the field. The workflow also had to be adjusted a number of times before it was sufficiently optimized. For example, we stopped using the program Perspective Rectifier as a method for orthogonal photo rectification and instead began using the ArcMap 10.1 georeferencing tools instead for a more precise and less distorted raster base. We hope to expand this recording method to the remaining excavation pods throughout the site in the upcoming excavation seasons.

## **24. The Ovens and Hearths of Çatalhöyük: Neolithic and Chalcolithic Cooking and Pyrotechnology**

Sheena A Ketchum, University of Indiana

During the summer of 2013, I continued my on-going dissertation research of the fire installations (ovens, hearths, fire spots, fire pits, and fire scoops) at Çatalhöyük. I began the preliminary analysis of the potstands from Çatalhöyük East and West mounds, and began conducting ethnoarchaeological research in Küçükköy regarding construction, manufacture, use, and repair of the external earthen ovens (ocak, tandır, and fırın). Through the course of my dissertation, I aim 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?

The bulk of my time at Çatalhöyük was dedicated to artifact analyses of the potstands, ethnoarchaeological research (conducted under IUB IRB study number 1304011170) on the outdoor earthen ovens in Küçükköy, the closest village to Çatalhöyük, and filling in the gaps in my existing data about the fire installation features.

I fully recorded nearly 400 potstands, which consists of all of the identified potstands present on site, including the shape, form, style, orientation, decoration, fragmentation, ware type, clay matrix description and inclusions, heat treatment, size, weight, color, and wear pattern. As part of the larger problems with the classification of clay objects, there are potentially other potstands stored with clay balls, clay objects, or elsewhere that haven't been recorded. Ideally, in future seasons, as part of the reclassification of clay materials, previously unidentified potstands will surface. For analytical reference, but not of publication quality, I photographed nearly 100 potstands to highlight certain stylistic aspects and decorative motifs and quickly sketched an additional 30 potstands. I decided to focus my analysis on the late Neolithic and Chalcolithic potstands at Çatalhöyük in order to explore how cooking technologies change over time at the site. The West mound was previously difficult to analyze in this study, because of the general lack of fire installation features. But with the inclusion of the potstands, I anticipate being able to analyze the cooking traditions of both the East and West mounds. During the latest Neolithic occupations, at Çatalhöyük, evidence suggests a shift away from the use of interior fixed architectural fire installations for cooking, towards the use of ceramic vessels balanced on potstands, placed over short-term temporary fire pit, fire spot, and fire scoop features. This is evidenced by the increased number of fire pits, scoops, and spots in the later levels of the North area and the appearance of some of the earliest crudely made potstands.

With the aid of Sema Bağcı Kaya and Dr. Sonya Atalay, I visited five households in Küçükköy, conducted interviews, documentation, and observation of the ocak, tandır, and fırın earthen ovens, which are still used daily for cooking, that are strikingly similar to those found at Çatalhöyük in terms of their construction and raw material selection. Through continued research on the ethnographic use of earthen ovens in Küçükköy and some of the other

surrounding villages, I will develop ethnographic analogies for how these features might have been used, what sorts of fuels work best in certain situations, and identify raw material sources for the different clays used in the construction of these earthen ovens.

### **Acknowledgements**

I would sincerely like to thank the Edward A. Schrader Endowment Fund of the Program in Classical Archaeology at Indiana University and Dr. Karen D. Vitelli for the opportunity and funding that made it possible to conduct this research. The ethnoarchaeological component of this project was conducted under Indiana University – Bloomington Institutional Review Board (IRB study number 1304011170).

## **25. Households in context: A microstratigraphical investigation of resource use and site networks**

Aroa García-Suárez, University of Reading

This PhD research represents an additional effort at understanding microstratigraphy at Çatalhöyük and follows the earlier work of Matthews (2005, 1996). This wider study is currently focused on the geoarchaeological study of buildings, middens and open areas from the Neolithic sites of Boncuklu (9th-8th millennium BC uncal), Çatalhöyük (8th-6th millennium BC cal), and Pınarbaşı (9th-7th millennium BC cal). This research has as an objective not only to put the large community at Çatalhöyük in regional perspective by comparing traces of activities at these three early agricultural settlements, but also to shed light into the resources and social networks of individual buildings across Çatalhöyük in order to develop a more detailed understanding of the different cultural and ecological household practices that were present at this site.

To achieve these goals, an approach that integrates the microarchaeological record with the macroarchaeology has been adopted. This involves first the development of a micro-excavation strategy that includes strategic sections through the entire history of each space, micro-sampling for all materials and deposits and 3-D recording. This new approach allows for higher-resolution identification, excavation, documentation and understanding of the information present in the individual micro-layers (between 2 and 5mm in thickness) that constitute a great part of the Çatalhöyük sequence. This strategy has been tested during the 2013 field season in the small but complex Building 114, North Area. From a methodological point of view, the well-defined architectural units at Çatalhöyük provide rigorous contextual data for testing new techniques and geoarchaeological strategies aimed at investigating depositional and taphonomic processes and continuity and change in activities and resources at high spatial and temporal resolution, which are critical to study of the nature and scale of the ecological and social strategies that sustained these communities.

In a second stage, the sediment samples collected during this field season are processed for microanalyses. At the heart of this methodological approach lies thin-section micromorphology, a technique that enables the microscopic study and identification of the nature, deposition, and periodicity of specific components indicating particular human activities and resource such as storage, food procurement and cooking practices. For the purpose of this research a number of geochemical techniques comprising SEM-EDX,  $\mu$ XRF, FTIR and GC-MS are being integrated with micromorphology in order to characterize specific deposits and elements related to variations caused by human activities. This methodological approach provides links between macroscopic observations in the field and the information gathered through microanalytical techniques that results in a better understanding of the whole archaeological record (Goldberg & Berna 2010; Shillito & Matthews 2013).

### **Excavation and sampling**

With the goal of documenting microstratigraphic sequences, Building 114 in the North Area of Çatalhöyük was carefully excavated in vertical 'slices' of *ca.* 1x1.5m during the 2013 field season, leaving at least one section exposed during the process. These sections provided great insight into the depositional histories of the building and enabled the application of a range of field and laboratory sedimentological characterizations, such as pXRF and micromorphology. Having a micromorphologist excavating as well as studying the deposits under the microscope is expected to strengthen the interpretation of these contexts through a tight integration of what is happening at the macroscale with the microanalytical results.

In addition to Building 114, a number of contexts from other buildings and open spaces were sampled for comparative analyses, including neighbouring buildings in the North Area (B.77, B.102) and South Area (B.89, Sp.470). Collapsed materials uncovered by Arek Klimowicz in Sp.511 and interpreted as rare roof remains or possible fragments of floors from the upper storey were also sampled to confirm this hypothesis and to compare these materials with internal floors and platforms from buildings. The study of this wide range of samples will contribute to the investigation of inter-household relationships across the large Çatalhöyük community and into the regional settlement landscape.

Sediment blocks and loose samples were taken from:

- Temporary section profiles left during excavation for sampling.
- Sequences exposed at the edge of burials, post-retrieval pits and truncations.
- Collapsed fragments of roofs/floors from upper storeys.

A total of 22 sediment blocks from buildings and open areas were collected and are currently being prepared into large (14x7cm) micromorphological thin-sections at the Soil Micromorphology Unit of The University of Reading. Results are expected to be available next summer.

### **Building 114**

The major focus of field analysis and sampling this season was on Building 114 which, although small (*ca.* 4x1.5m) when compared with other buildings at Çatalhöyük, shows the whole range of features that are present in larger buildings, including several burials, wall paintings and plastered platforms. Results from the excavation season indicate that this space was well maintained, with its raised N-S platform (F.7114) showing multiple layers of white plaster which were kept almost completely free from residues. Although so far only the eastern half of the building has been partially excavated, it seems that the boundaries in this space were well defined, as the differences in the phases of architectural construction of the sitting/sleeping area and the burial platform indicate.

The excavation and sampling of this building will continue next season. So far, Building 114 has proven to be of great interest to investigate the function of small but independent buildings at Çatalhöyük and the ecological and socio-cultural strategies they represent within the wider organization of the settlement.





Figure 25.1. Eastern half of building 114 during excavation, facing west.

### **Acknowledgements**

I am grateful to the Konya Museum for the permission to export the micromorphological blocks and sediments. I would like to thank Ian Hodder, Burcu Tung and the North, South and TPC teams for support with sampling. This fieldwork has been possible thanks to a study grant from the British Institute of Archaeology at Ankara.

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## 26. Survey and fieldwalking in the immediate environs of Çatalhöyük 2013

Mark Jackson, Sophie Moore, Eniko Hudak and Thomas Sutcliffe  
Newcastle University

A team of postgraduate students and recent alumni from Newcastle University supported by the Roman Society and the School of History, Classics and Archaeology Newcastle University were present at Çatalhöyük for two weeks from the eighth to the twenty-second of August 2013 to undertake a ceramic survey in the area surrounding both mounds specified by the Turkish Ministry of Culture and Tourism (shown in Figure 26.1). The main objectives were to conduct a program of field walking and ceramic collection within the field system around the site which would allow us to identify, locate and ideally date any settlements within the targeted survey area. Of particular interest was the possibility of locating the settlement dating to the first or second millennium AD relating to the cemetery present on the mounds. An additional objective was to note any evidence of the Chalcolithic cemetery which is expected to be located in the vicinity of the West mound – no evidence was found of this cemetery.

The area covered by the third degree of the Çatalhöyük permit allowed us to conduct surface survey within an area roughly 300m from the outer limits of both sites (Fig. 26.1 shows the permit map provided by the government representative at Çatalhöyük, Fig 26.2 shows the permit boundary georeferenced in GIS to map data constructed from photostitched satellite imagery of the area available through TeleATLAS aerial imagery). The area covered by the permit measured 2km<sup>2</sup>. We did not sample fields in which the crops fully obscured the ground surface (39% of the study area). The sampled area was limited therefore to 1.2Km<sup>2</sup> of fields under sparse crop, ploughed fields or fields where the wheat had already been harvested.



Figure 26.1. Map of third degree permit boundary provided by the Ministry for Culture and Tourism



Figure 26.2. Map constructed in GIS by Tom Sutcliffe with reference to TeleAtlas satellite imagery and GPS data

### Survey Methodology

The survey operated within sample units defined by the shapes of fields. The dimensions of each field were defined both through satellite imagery and the collection of GPS data, while details of land use and artefacts were recorded on the ground. Photos were taken of each field surveyed and detailed shots of the ground surface taken to record agricultural use and visibility. These photographs, along with images of the collected ceramics are available within the Çatalhöyük photographic archive.

Within the fields available for survey our ceramic sampling strategy was to walk transect lines at 20m intervals stopping after each 20m to record the quantity of body sherds and tile fragments from that transect division, and to collect the feature sherds (rims, base sherds and handles) and any glazed or otherwise decorated body sherds). This collection strategy meant that every sherd collected can be located to within 20m of its find spot. The ground visibility within the transect division was rated between 0 and 5 (where 0 was complete ground cover and 5 was a highly visible ground surface without any cover from crops or disruption from ploughing). Material was collected and recorded from a maximum of 1m either side of the transect line being walked.

Before starting to walk along each transect line, the surveyors were positioned at 20m intervals along the longest axis of each field. The starting points and end points of each transect line

were recorded using a Magellan professional GPS running DigiTerra Explorer 5. The 20m divisions along each transect were usually paced rather than measured using a tape or GPS.

Once they had been recorded in the field, the data were imported into GIS. First, the outlines of the fields were digitized as polygons in the GIS. GPS points showing either end of the transect lines walked in the field were then imported. Next the transect divisions were plotted every 20m by dividing the transect line by the number of divisions made by the fieldwalkers. (Since the team had paced out the 20m divisions along the transect lines, rather than measuring exactly every 20m with GPS, the transect divisions between the known endpoints were in some cases not exactly 20m.) Transects were walked in different directions depending on the situation in each field; this allowed fields to be walked along the lines of planted crops thereby increasing visibility.

### **Naming conventions**

Collection took place up to 1m each side of the transect lines walked. The 20m divisions of each transect formed the smallest unit of collection and recording. We implemented the naming convention that fields would have a 3 digit ID number, transects a 2 digit ID number and transect divisions single digit numbers. These numbers build sequentially so that while a field is identified by its F number (e.g. field number 001), the second transect in that field is identified by both field and transect number (e.g. transect number 001.02) and the fourth transect division of the second transect of field 001 would be 001.02.4. The pottery sherds collected are identified with the same convention, so that the first sherd processed from the transect division described above was entered into the access database as sherd 001.02.4/s1, while the physical sherd is labelled without the additional 0s to save space on the ceramic surface (01.2.4/s1).

The survey methodology implemented this year was based on the intensive survey methodology developed by Dr Andrew Bevan at Antikithera and Dr Katie Green at Pisidia (Bevan and Conolly 2012, Green 2013: 99).

### **GIS and digitization methodology**

Geospatial representation and subsequent analysis of the data was completed using Esri's ArcGIS 10.1. Initial GPS data, consisting of control points, were received in the geographic WGS1984 co-ordinate system and were used to georeference raster satellite images of the site and surrounding area, obtained from TeleAtlas. Though this imagery was several years old, it was sufficient to observe field boundaries and create a polygonised field system within the permit limit described above. Only a few boundaries had been altered since the imagery was taken and these were easily updated using the GPS data. The field system was then labelled using the conventions outlined above and divided into transects and transect divisions. The unique transect division number replicated on the database was used to connect the pottery data to the GIS. This was undertaken through an OLE DB connection to the Microsoft Access database. ArcGIS 10.1 is not compatible with newer versions of Access, so the database was reverted to a 2003 version with the file extension '.mdb', as supposed to the more recent '.accb'.

### **Ceramic Analysis methodology**

The aim of the ceramic analysis was to quantify the different kinds of ceramic material according to its provenance. Objectives were to create a representative form and fabric type series from the feature sherds collected and to quantify all the collected material according to fabric, form and provenance. The quantification was recorded in Access database and subsequently linked to the GIS.

The feature sherds that were collected were quantified by number of sherds, weight and in the case of rims and bases, also by Estimated Vessel Equivalents (EVEs). Only one sherd of each type in the form series was drawn. Handles and spouts were drawn as small finds: top view, side view and profile/cross hatch. Rims and bases were drawn according to pottery drawing conventions with profiles on the left side. Drawing numbers were assigned sequentially as an independent index and can be consulted in the archive.

A fabric type series was also created for reference so that all collected feature sherds could be allocated to a fabric type series in the database. Sherds were clipped with a set of pliers to produce fresh breaks and were examined with a 30x21mm jeweller's loupe. Colour, hardness, feel, fracture were recorded with regard to terminology suggested by Orton *et al.* (1993: 235). Inclusions were described in terms of size, frequency, sorting, shape and colour. Surface treatment was also given by its nature and colour, e.g. cream slip, red burnished, etc.

The feature sherds collected and the form type series and fabric type series recorded are stored in the depot at Çatalhöyük.

The recording of each feature sherd according to the form and fabric type series, as well as by weight, EVE and diameter will enable more complex analysis and presentation of the data to be carried out. For the purpose of the maps in this field report (Figs. 3 and 5), Boolean operators were applied in order to add various data fields together (such as body sherd count and feature sherd count) prior to weighting the final symbology in GIS. Natural breaks were implemented with 10 classifications to display the data here. A zero value was used to highlight areas where no pottery or other metadata was present. In certain circumstances, high ranges were also grouped together, which avoided anomalous quantities affecting the rest of the data displayed.

### **Preliminary Results**

Figure 26.3 shows the areas surveyed and the total quantities of ceramic material recorded. Fieldwalking and ceramic collection was judged an appropriate means of attempting to locate settlement of the first and second millennia AD. The presence of an alluvial layer (approximately 3m thick) which separates the prehistoric levels from the historic levels meant that we expected the fieldwalking to recover evidence for occupation relating to occupation from historic periods (Roberts, Boyer and Merrick 2007: 533). We aimed to discern whether the scatters of ceramic on the alluvial plain might consist of run off from the mound or up-cast material (if prehistoric pottery was present), or conversely if the ceramic scatters would represent an actual settlement which had been left largely undisturbed. Preliminary analysis enables a number of conclusions to be drawn. Three main hotspots of pottery were present



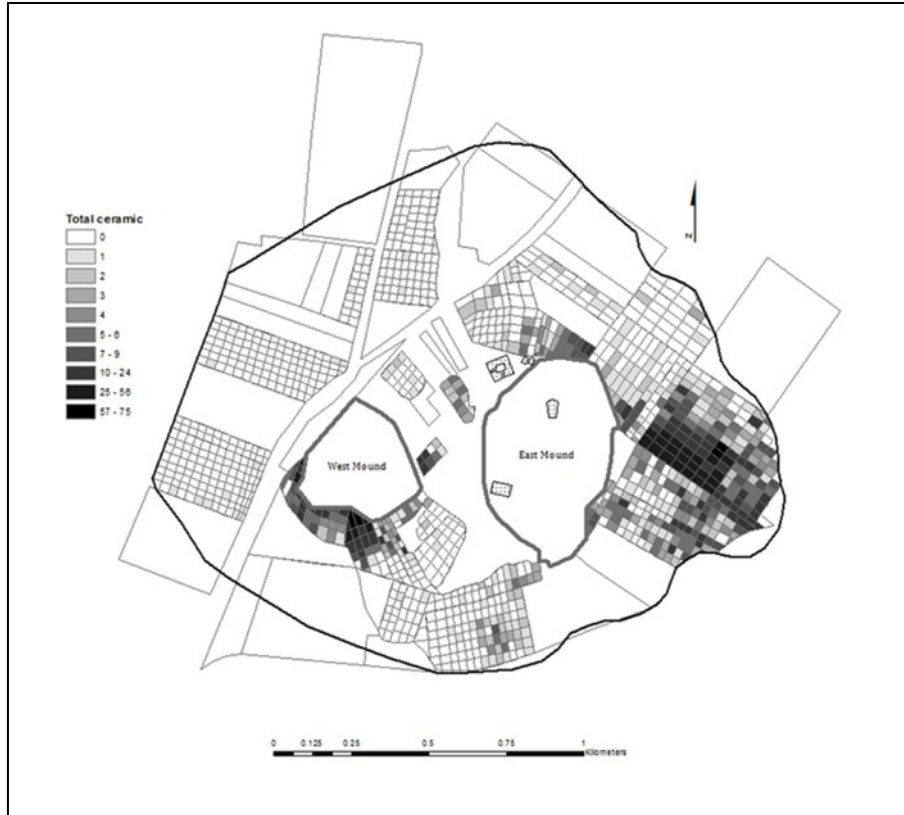


Figure 26.3. Map of surveyed area showing total quantity of ceramic found by sherd count (body sherds, collected feature sherds and tile). Plan: Tom Sutcliffe



Figure 26.4. Sherd 027.02.01/s1. Photography: Sophie Moore

(shown in Fig. 26.3), one south of the West Mound, one East of the East Mound and one north of the East Mound.

The pottery south of the delineated extent of the West Mound was almost universally composed of Neolithic and Chalcolithic sherds. The density of pottery and the shape of the fields which follow the topography here confirm that the West Mound extends slightly further south than the fenced area. This was to some extent expected as the West Mound continues to slope away to the alluvial plain beyond the limit of the fence. A zoomorphic spout

(027.02.01/s1) was recovered from this area, and is shown in figure 26.4. *Tegulae* (tiles) were also noted in this area, however in the absence of other historic-period pottery it seems plausible that these tiles were employed similarly to those on the mounds where they are associated with later burials (Moore and Jackson 2013). The presence of these tiles with little other later ceramic evidence suggests that the Roman and Medieval cemetery may have extended to the limit of the mound. Figure 26.5 shows the scatter of tile throughout the survey area, and when compared to Figure 26.3 can be used to discern different patterns of landscape use.



Figure 26.5. Map of surveyed area showing tile counts by transect division. Plan: Tom Sutcliffe

East of the East Mound there is a high concentration of body sherds, feature sherds and tile (Fig. 26.3). The pottery in this area is largely wheel made and preliminary analysis suggests that it is largely Roman and Byzantine with a minimal quantity of later Green Glazed ware. The high concentration of *pithoi* and tiles in addition to the presence of cooking wares and fine wares suggests that this is a domestic assemblage rather than a continuation of the first and second millennium AD cemetery present on the East mound.

The extent of the scatter in the area east of the East Mound, its composition and its comparatively high density compared with elsewhere in the survey area as a whole combine to make it likely that this is the location of at least one of the settlements associated with the first and second millennium cemetery which covers both West and East Mounds. The size of the

cemetery (with over 230 graves excavated so far) raises the question whether there may have been other settlements in the surrounding un-surveyed area which could have used the mound as a cemetery.

The concentration of sherds south south-west of the East Mound appeared to be less pronounced than in the area east of the East Mound, but it included a similar range of ceramics and since the visibility there was poorer, we may suggest that this scatter also may well represent settlement.

A column capital associated with a concentration of ceramics 500m northeast of the east mound drawn to our attention in 2012 is outside the area covered by the Çatalhöyük permit for fieldwalking and ceramic collection and was therefore not investigated.

### **Preliminary conclusions**

There are a number of distinct ceramic scatters in the area surrounding the two mounds of Çatalhöyük, some of which probably indicate the location of previous settlement.

The significant area (at least 140m x 120m) of ceramic material east of the East Mound included cooking, storage and fine wares in addition to tile; this is likely to indicate the location of a settlement related to the late cemetery.

A concentrated area of ceramic material north of the East Mound which has a similar profile of types indicates the location of further settlement. The ceramic evidence south of the West Mound probably does not indicate the presence of a late settlement, despite the presence of *tegulae*, but rather shows the limit of the prehistoric site beyond its modern defined boundary while the *tegulae* indicate the extent of the late cemetery in the same area.

The presence of green-glazed ware between the mounds appears to be related to the location of the current farm house.

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## 27. Reflexive Methodology

Åsa Berggren, Sydsvensk Arkeologi AB

The Çatalhöyük Research Project has over the years kept working with the reflexive methodology outlined at the beginning of the project (Hodder 2000) such as the diary and the priority tours. The commitment towards this methodology has varied which has resulted in an uneven record of e.g. the diary, but generally the methodology has become a 'natural' part of the project's work. However, the reflexive methodology has developed and changed during the time it has been used by the project. It is not the same as in the start; certain parts have been omitted (such as the on site anthropologist), others have developed and changed (such as the diary) and others have been added (such as the daily sketch).

The reflexive methodology at Çatalhöyük has been evaluated and a discussion will be published shortly (Berggren & Nilsson forthcoming). This evaluation comes to the conclusion that the methodology has been both successful and unsuccessful in both its implementation as well as in promoting a higher degree of reflexivity. The evaluation discusses some of the underlying factors behind this uneven result. They can be found in a complex interplay between many factors in the – in itself complex – project, among those structural differences and imbalances that have affected the success of the methodology. This is developed further in the forthcoming volume 10 of the project's publications.



Figure 27.1. The seminar room during afternoon lab hours. Excavators are working on the documentation. Facing the camera are Stella Macheridis and Aroa Garcia-Suarez. Photography: Åsa Berggren.

During the seasons of 2012 and 2013 some changes were made to encourage a deeper involvement in the reflexive methodology. To develop the diary into a more interactive instrument some changes were made to its function and layout. However, these changes had to be kept within the limits of the software (Microsoft Access) used, to comply with the general database and to keep the link to older entries in the diary database. To encourage dialogue and comments we made it possible to reply to entries. We also changed the layout to make the last few entries visible to anyone entering the diary database, to encourage the users to read each other's entries. We also introduced the possibility to tag entries with key words, to make searches and discussions easier. Prompts and instructions of how and what to write in the diary were also included in the database, to make the objectives of the diary

clear.

Earlier in the history of the project, only excavators were encouraged to write diary entries. Laboratory staff were not explicitly asked to participate, and had only on rare occasions made entries in the diary. During both 2012 and 2013 all participants of the project, both excavators and laboratory staff, have been explicitly encouraged to participate in the diary. As a part of making the diary more visible for all project members “The diary of the day” was introduced in 2012 (after an idea of Allison Mickel) and continued in 2013. A short quote from a diary entry is chosen (not on a daily bases, but every few days) and posted on a few places around the dig house where many people can see it. The aim is to trigger discussions as well as to encourage participation in the diary.

In 2012 ‘The daily sketch’ was introduced to the whole project. It has been used by the team working on the West mound for several years, but now it was starting to be used on the East mound as well. In 2013 it was a part of the daily documentation routine. The daily sketch can be seen as a visual complement to the diary – a kind of visual diary. The sketch is done by the excavators, drawing and writing on a printed photo of their area of excavation, on a daily basis. The printed photo with comments and drawings is then scanned and uploaded to the database where it can be searched by unit or feature number. This way the daily progress of excavation is made visible and is documented. As some of the excavation staff were new in 2013, the daily sketches from 2012 turned out to be a very useful source of information in addition to plans and recording sheets for those who took over an area excavated the previous year. In fact, some thought the sketches the most useful of the documentation.

As a part of the development of 3D documentation on site we have also experimented with using 3D-pdf’s as daily sketches. 3D-models were made of the area of excavation and turned into interactive pdf’s where notes and drawings were added. These could be viewed from different angles as the pdf was moved around. However, it was thought to require too much work for very little added information to make the 3D pdf’s. One of the assets of the paper version of the daily sketch is that it is very quick and effortless to make and scan.

As a part of the reflexive methodology the priority tours have continued, as an arena for discussions between different categories of participants of the projects, such as the excavators and representatives of the various laboratories. These discussions are especially dependent on personal confidence and experience to be reflexive. As we have had a portion of new staff among excavators as well as in the laboratories during the last two years, the priority tours have been a little hesitant during the beginning of the seasons, but as time passed a constructive climate for discussions developed on the tours. A lack of instructions in the beginning of this season also led to some confusion of the objectives of the tours. This will be rectified for the coming seasons.

The documentation system at Çatalhöyük is based on a series of recording sheets that are filled in during excavation, the first one being the unit sheet. Skeleton sheet, feature sheet, building sheet and space sheet are also included in the hierarchical system, based on single context



recording. During the 2013 season we made some changes to the sheets, mainly the unit and skeleton sheets. The order of the fields to be filled in were changed to better correspond to the workflow during excavation, in order to emphasize documentation as an on-going process during excavation, and make this documentation easier. As the documentation is a part of a reflexive thought process, it is important to capture the whole process in the record. We also made the paper version and the database version correspond, not to cause any confusion of what should be recorded. Some fields were made invisible in the database as they are no longer used and other fields were added, such as a separate field for finds.

As the documentation sheets changed, the instructions in the crib sheet were also changed and updated to current practices, as the current version had not been updated for several years. The crib sheet now includes more specific instructions to the practical ingredients of the reflexive methodology.

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## 28. Diaries, 2013

Allison Mickel, Stanford University

Since 1996, the Çatalhöyük Research Project has employed the use of diaries as a means of recording the broader context surrounding the rest of the archaeological data contained in the database. Both excavators and laboratory researchers are encouraged to write two diary entries each week, which consist of narrative accounts intended to center on developing research questions and interpretations. All of the diary entries are posted online at the end of each season, along with the conventional recording forms completed during excavation. The exact content of the diary accounts has varies extremely according to the author of the entry, since little guidance and control has been executed over the diaries. Moreover, the number of posts expected of each researcher and the emphasis placed on the importance of the diaries has likewise varied across field seasons. As a result, the diary database is comprised of a diverse body of narrative accounts which document the documentation at Çatalhöyük in extremely varied ways.

Between 1999 and 2011, however, participation in writing diary entries decreased dramatically until there were only seven diary entries written by the entire East Mound research team<sup>2</sup>. In 2012, some preliminary interventions were designed and implemented which aimed both at increasing participation and at increasing linkages between diary entries as well as the rest of the database. These strategies were further improved and integrated into the project's methodology in the 2013 field season. In this report, I review the changes made over the past two field seasons, and briefly addresses several ongoing research projects focusing on the diaries at Çatalhöyük. I will conclude by discussing future plans for the diary medium in upcoming seasons, and as the project looks toward its conclusion.

### Recent Changes to the Diaries

Recognizing the paucity of diary entries in 2011, the diary platform was redesigned in the 2012 season to make the diaries feel more immediately useful and relevant. We hoped that these changes would not only encourage more team members to completely entries more frequently—but also that the content of the diaries would increase in richness, complexity, and utility. One of the modifications, accordingly, was to add a list of guidelines to the Microsoft Access platform for posting to the diary database. Team members are now prompted to write about topics such as their interpretive process regarding specific units (e.g. hypothesis for how particular deposits were formed, questions that have arisen over the course of excavation), how multiple units and features relate to one another, and the reasoning behind their excavation strategies. The guidelines also remind team members that these are not meant to be personal diaries, focusing on one's intimate emotions or feelings toward the project or other team members.

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<sup>2</sup> The West Mound excavation team employs the use of daily diary entries as part of their recording methodology; therefore there were 139 diary entries from West Mound team members in 2011. The interventions focused on increasing participation and in guiding the diary content were mainly targeted at the East Mound research team.

Additional functionalities were also added to the diary writing platform. Not only are researchers now able to tag their entries with the unit, feature, space and building numbers referenced in their entries, but they also now possess the ability to write their own free-text tags describing the topics addressed in their accounts. These tags enhance the searchability of the diary database, as well as create links between entries centering on related discussions. The tagging feature has not yet been migrated to the website, but examples of some tags include “methodology,” “burials,” and “end of season.” One especially noteworthy tag is “#Catalhoyukproblems,” which illustrates that team members recognize similarities between the diary platform at Çatalhöyük and social media networks such as Twitter and Facebook, which use the hashtag symbol to encode tags of discussion topics. This is significant, given that one goal for the diary platform redesign was to increase dialogue between team members. The way the diary writers have appropriated the tagging system to more closely approximate these global, public social media networks demonstrates that the Çatalhöyük team members are seizing the opportunity to connect with other researchers on the project via the diary medium.

A further, related, revision to the diary system was to enable diary-writers to reply directly to other posted entries in the diary database. At the bottom of each entry there is now a button labeled “reply,” which opens to a screen for composing a new diary. This new entry is directly linked to the original. Responses are marked with the entries to which they reply and vice versa, allowing for easy navigation between dialoging posts. This feature has been incredibly successful over the past two field seasons in generating debate and conversation within the diary entries; discussions have consisted of as many as six consecutive entries. These discussions can be examined later to recreate the interpersonal hermeneutic processes leading to the final, published results of excavations at Çatalhöyük.

These modifications to the diary platform have been successful at encouraging certain types of entries—specifically, entries that respond to one another and focus on ongoing major issues in analysis and interpretation. This has increased the total coherence of the diary database, as well as its utility to researchers both during and following the excavation season. The changes made to the Microsoft Access platform, however, would be unlikely to alone increase participation in diary writing, as they are invisible until the user logs onto the system to create an entry or read others. Therefore, we also sought ways to visibly remind team members to contribute diary entries and to peruse the narratives already posted.

### **Diary Entry of the Day**

In the 2012 season, Asa Berggren and I began selecting an excerpt from one diary each day to post in highly visible areas of the dig house. The aim was to generate daily discussion about these quotes, and to create a culture of diary-writing by embedding the diaries—usually in digital and intangible form—in the physical, embodied landscape of the project. By posting these excerpts in high-traffic, conspicuous places like the announcement board, above water fountains, and even in the bathrooms, we hoped to make them something impossible to ignore. Moreover, in contrast to the largely unchanging daily routine of the workday, the diary entry of the day would be something new and different each day.

The selection of the excerpted entries was based on how well the entry exemplified the stated goals for the diary recording system. We also tried to feature a diverse range of team members, in terms of age, nationality, specialty, and position. Each excerpt was approved by the original writer, and posted each day right before dinnertime.

The quantitative success of this endeavor was evident; from seven entries in 2011, there were almost 150 entries in 2012 and 2013. Moreover, the diversity of perspectives included increased dramatically. The database in 2012 and 2013 features contributions from every excavation area and material specialty. The Diary Entry of the Day even engendered verbal dialogue between members of the research team. Visible conversations took place around the posted entries, extending debates beyond the digital diary medium. By the end of the 2012 season and throughout this past season in 2013, some team members even requested that their entries be made Diary Entry of the Day, for the express purpose of sparking discussion and receiving feedback on their thoughts and concerns.

Of course, the Diary Entry of the Day was not without its drawbacks, although most of these were resolved before the start of the 2013 season. Some of the early posts sparked some brief conflict and concern, so we were sure in 2013 to be careful about the excerpt content and to be sure to confirm the exact excerpts with the original authors. A few team members also expressed worry that people might be afraid to write diaries, or to express frustrations, for fear of the increased visibility of the diary platform. On the contrary, it seems that the Diary Entry of the Day has proven helpful for team members to recognize shared concerns and, accordingly, formulate productive and collaborative approaches to resolving these concerns.

The renewed interest generated in creating diary entries has corresponded with a parallel increase in research projects that focus on the diaries. There are currently three main ongoing research projects, active in the 2013 season, aimed at interrogating various aspects of the diary system. These projects are described below.

### **Ongoing Research with the Diaries**

One of the research projects that has employed the diaries has been conducted since 2012 by Tom Frankland. His study examines whether a technological intervention using the diaries could improve collaboration and awareness between members of the Çatalhöyük excavation team. He has created visualizations based on the linguistic similarity of diary entries, which serve as a visual representation of the discussions occurring on site at Çatalhöyük. A slideshow of these visualizations was uploaded to a video display in the dig house for around a week in both 2012 and 2013, and Frankland has conducted ethnographic interviews with team members to gauge the impact of the intervention. In 2013, he also captured researchers' interactions with the display using a video camera.

Elijah Meeks has been conducting similar research on the topics discussed in the diaries. He has employed the technique of topic modeling to identify shared themes in diaries over time and space. His representations show what kinds of words and language occur together most often, organically sorting into broader topics which illustrate how archaeologists at Çatalhöyük think

and write about these issues. He will be using these shared themes to identify similarities between diaries and annual reports, as well as trying to better understand change in practice and language on the site over time.

Finally, my own research works to contrast the diary medium as a recording system with the other recording methodologies employed on site. Specifically, I have been examining the information contained in the diary entries as compared to the unit and feature sheets. My research has illustrated a great deal of overlap between these two recording systems, and I am currently working to quantify this redundancy and to publish these findings. I hope to illustrate the utility of the diaries despite the apparent repetition of certain kinds of information. Specifically, I will show how the diaries can actively contribute to research during the field season as well as for indefinitely preserving moments of the hermeneutic process which would otherwise be ephemeral. The modifications to the diary recording system described above, and the ways that team members have responded to these changes, are extremely significant for illustrating this point.

### **Conclusions: Future Directions**

In the coming seasons, we have some remaining goals for further improving the diary database system. The first is continuing to increase participation, and furthermore diversity of participation. We will continue to reach out to the various teams at Çatalhöyük, to encourage students and specialists to post entries, and to seek innovative ways to make the culture of diary-writing increasingly vibrant. In the 2013 season, we also began discussing ways of overcoming the language barriers posed by having such an international team at Çatalhöyük. Hopefully, we will be able to identify opportunities for non-English speakers to contribute to the archive; the flexibility and open-ended nature of the diary platform is extremely promising for this goal. If we do find ways to systematically and seamlessly include data recorded in other languages, it may even be possible for local workmen to contribute to the data recording strategies at Çatalhöyük for the first time.

Another concern regarding the future of the diary medium is integrating the diaries with other database information. This has been achieved in part by adding the tagging feature, but as mentioned above, this has not been ported to the web version of the Çatalhöyük database, meaning that it is not accessible offsite. The diaries and the daily sketches created by excavators are stored in the same repository, but there is minimal connection between the two data sets. It would be ideal to connect the diaries, the daily sketches, the excavation data, and even the photos and videos collected at Çatalhöyük—to make it possible for researchers and the public to navigate between these media in intuitive ways.

If this level of integration is achieved, more interested researchers and members of the public will be able to study the diaries, not only in isolation, but also in the broader context of the total data collected over the project's duration. This becomes an ever-greater advantage as the Çatalhöyük Research Project excavations come to an end and the data must be published and archived in full. Ideally, this can be done in a way that makes the data, including the diaries, most useful to all of the diverse communities interested in studying Çatalhöyük. The



modifications that have recently been made to the diary recording system and the ongoing research examining the diaries—all of the projects described above—contribute in the short-term to achieving this eventual aim.

## **29. Personal and reflexive video recording in archaeological research**

Patina Project members, Southampton University: Graeme Earl, Angeliki Chrysanthi  
Southampton University, Research Staff: Hembo Pagi

Study participants: the members of the West Mound excavation team (P. Biehl, J. Rogasch, J. Brady, C. Filet, I. Franz, D. Griswold, G. Naumov, E. Ruzi, K. Teuwsen, and P. Willett)

This study was conducted as part of the Personal Architectonics Through INteraction with Artefacts project (PATINA) project, which aims to revolutionise the design of technologies for supporting research, by emphasising the primacy of the research material. Archaeological fieldwork at Çatalhöyük was one of the research environments being studied by the project in order to attain a better understanding of the working environment and to examine the influence of new technologies in practice.

The aim of this study was to provide a rich account of fieldwork, as an interesting working environment, and to further explore the notion of 'reflexive methods' in archaeological interpretation with the aid of video recording. Video documentation has a long standing presence in ethnographic studies and archaeological research (Hodder 2000, Rakić and Chambers 2009, Morgan 2013). The use of video recordings has played a significant role in the documentation of Çatalhöyük as a means of capturing interpretation at the 'trowel's edge' (Hodder 1997), enabling 'a full hermeneutic process' and reflexivity in interpretation (Hodder 1995, 2000). In past seasons, such video recordings were implemented via a dedicated site videographer who captured the on-going interpretations of excavators and specialists as they evolved over time. The video cameras employed for filming tend to be stationary and the resulting recordings appear to be somewhat 'staged'. As a result, the recordings do not generally capture the actual processes of excavation, the interpretation expressed between excavators or the archaeological materials as they occur. This is eloquently described by Ian Hodder (1995): 'As each scene is set up and later watched on the monitor, one cannot help but be aware of how constructed is the result. The placing of the camera and the choice of topics and words involve selection and representation.'

Also, considerable effort has been put in the past to handle (edit, annotate) such data and more importantly to make them easily accessible to the team members. The large volumes of video are often difficult to manage, search and parse for important information, and unlike other types of data the video archive is still left under-inspected and stored independently of the interpretative process.

In order to address 1) the issue of stationary recordings and 2) issues related to handling video data, we ran a preliminary study in which archaeologists were provided with a lightweight and wearable recording device as well as with a video management application. The study involved recordings with personal and wearable devices which captured either physical interactions of participants with their primary research material or conversations among members of the

team. It also entailed an assessment of this process and its impact in archaeological research. The technology is not intended to be a means to monitor archaeologists' behaviour but rather to provide an easy way to prompt memories of important discussions or on-going interpretations and to promote collaboration. This report mainly focuses on the employment and evaluation of novel technologies used 'in the wild' and provides some preliminary insights into whether such technologies are useful to archaeologists and how we can improve the flows of existing processes of capturing, depositing and retrieving generated data. Our ultimate goal is to disseminate the outcomes of this study amongst our partners in the PATINA Project and the Çatalhöyük Research Project. Hopefully, this study will prompt the conception and implementation of novel ways of generating and interacting with video data in an intuitive and effective way for archaeological research and will join with the significant and long-standing research on 'reflexive methods' at Çatalhöyük, conducted by other members of the project. The video recording device and the management application

The system chosen for video recording is an off-the-shelf device called Looxcie 2, a small wearable and lightweight video camera which records everything the user sees and hears sitting over the ear. Additionally, with a simple operation, the user can capture the past 30 seconds and create a short video segment which allows the creation of manageable video files and the capture of interactions even when they were not anticipated. The device can either be operated directly through simple controls located on the device or via a smartphone/tablet application (android, iOS).

For handling video data we used the Synote, a software created by the MACFoB (Multimedia Annotation and Community Folksonomy Building) project, a JISC funded project carried out at Learning Societies Lab, School of Electronics and Computer Science, University of Southampton. Synote is a web-based application that enables the creation of synchronised bookmarks, the 'Synmarks', which can contain notes and tags synchronised with audio or video recordings and transcripts, and can be used to retrieve and replay segments of the recordings. The particular application allows users to add notes and tags to several parts of a single recording (unlike other systems that allow such operations to the whole file) and thus, searching and 'parsing' of video segments and the accompanying information becomes a less trivial task.

Procedure for the deployment and the evaluation

Our study was conducted at the West Mound excavation, supervised by P. Biehl. In terms of choosing participants for the study our main concern was to ensure the participation of members who play different roles in the team ranging from students and experienced excavators to supervisors. Another important factor was the availability and consent of the selected people to participate in this task. Most members of the team were keen to participate, since they were already familiar with recording practices. They also appreciated the potential of using the device in fieldwork and fully consented to provide us with the generated data in order to study their work.



Figure 29.1. Participants recording their observations with the wearable devices.

On the first day of the deployment, the archaeology team was introduced to the device and the different modes of recording, and the selected participants were instructed on how to operate the device to ensure recording. This process was repeated each time a new participant took over. In total seven participants took part in this six day study, two of whom used the device for three days, four used it for two days and one participant used it only once. Additionally, the finds specialist of the team who usually works in the

labs had the opportunity to watch some the captured video segments and provide his assessment.

The evaluation procedure mainly involved observations and interviews. Participants were observed while using the device and besides that, notes and photos were employed to document what participants did with the technology, what sort of information they captured and what they did with that information. Each day participants were given the video segments they recorded and were encouraged to review them in the labs during evening hours and keep short notes on whether these recordings were useful and how. In accordance with our ethical procedures, the process of data collection involved the participants choosing to give us the data they had captured since we wanted the excavators to feel in control of opting out of giving us particular data to ease any privacy concerns. In practice, this procedure was realised in the post excavation phase by e-mail correspondence. Additionally, interviews of approximately 30-45 minutes were conducted at a time that caused minimum disruption to the everyday workflow of participants who agreed to participate in this study. The interviews were conducted in a semi-structured manner which was achieved by posing certain open-ended questions to ensure variety in responses and facilitate a constructive dialogue between interviewer and interviewee. Finally, video analysis is the third evaluation method used to decode certain patterns of interaction between users and the device, team members and research practises. For this, a significant corpus of data was disseminated among experts of video analysis and narrative within the Patina project.

### **Main findings from the evaluation**

#### ***Preliminary observations***

In the beginning of the study the users were instructed to keep record on and use the 30 second highlights as much as possible in order to generate small and manageable video segments of the important things that occurred during their work. After the first two days, when the team members had already experienced the use and the functionalities of the device

in their daily routine a certain ‘stance’ towards the process started to emerge. Although, participants acknowledged that the highlight functionality was useful as it provided the opportunity to do some in situ refinement of data selection, there was almost no use of it. According to their assessment the thirty second clip was not really long enough to capture something useful about their work and as a participant commented: ‘...if you feel that you have to operate it in some way then you are starting to concentrate on that task rather than your usual way of working on-site’. Eventually, the participants took absolute control of their device by switching it on and off; a fact which negated the benefit of a serendipitous capture discussed above but at the same time it gave more control to users.

An interesting observation concerns the different ways which participants followed to conduct video documentation. Some participants mainly chose to record conversations they had with their colleagues about certain aspects of their work. Others, prioritised recording at certain moments when they decided it was worth keeping a note. In those cases, video segments are characterised by a certain activity (e.g. excavating, pointing at certain locations, moving between and pointing at certain spaces) and a ‘keeping-note-to-self’ type of narration (Fig. 29.2). Other types of recording encountered, involve the actual process of excavation with no auditory comments. As a participant explains ‘I didn’t actually talk to myself about what I was doing...I was more interested in keeping a visual record of my excavation processes’.



Figure 29.2. Foreground: recording a conversation –  
Background: recording notes-to-shelf

A different type of observation has to do with the variety of gestures participants use to communicate their ideas to peers or excavate according to their on-going interpretation. When archaeologists were engaged in a conversation about spaces, structures and generally large features of their working environment they tended to exaggerate their bodily movements and open up their hand gestures (Fig. 29.3). On the contrary, conversations about small finds or areas of interest, colour and texture tend to be accompanied by subtle gesturing (Fig. 29.3). Such gestures could potentially be technologically explored and utilised as a complementary mechanism to automate the process of editing, annotating and archiving video data in categories.

Also, the pace of excavating differs depending on the level of understanding of the context that is being excavated. The observer can identify slow and indecisive movements, fast and rigorous paced troweling, explorative or procedural ways of interacting with archaeological materials. Such variations in gesturing are largely picked up by



personal video recordings, such as the Looxcie. This could be added as another layer of documentation which has to do with the elusive processes and modes of interacting with the archaeological material and the state of being while performing certain actions.



Figure 29.3. Different types of body and hand gestures depending on the context of discussion

### ***Evaluation of Synote: annotating and retrieving video segments***

Recognising the potential of Synote for handling personal video recordings in archaeology we ran a small scale evaluation with the help of some participants of the main study to evaluate the application's efficiency in archaeological research. The Synote team, provided us with a standalone version of the application, suitable for running at the excavation house and accessible from a variety of personal devices such as laptops (Mac OS and Windows environments) and tablets (Android and iOS platforms).

Participants were given a brief overview of the application and its affordances and started to watch certain video recordings that either they or their colleagues created, with their personal or provided by the project tablets and laptops. Controls on the player were used to Play, Pause, Stop the media and control the volume, and the size as well as the viewing mode (full-screen, embedded screen to the Synote interface) could change to the user's preferences (Fig 29.4).

The application enabled users to perform simultaneous to the viewing annotations in the parts that they felt a comment was required. This was achieved by creating a bookmark (Synmark), at any part of the video recording which automatically kept the time information while other information (like title, end time, comments and tags) could be manually or semi-automatically entered by the user (Fig. 29.5).

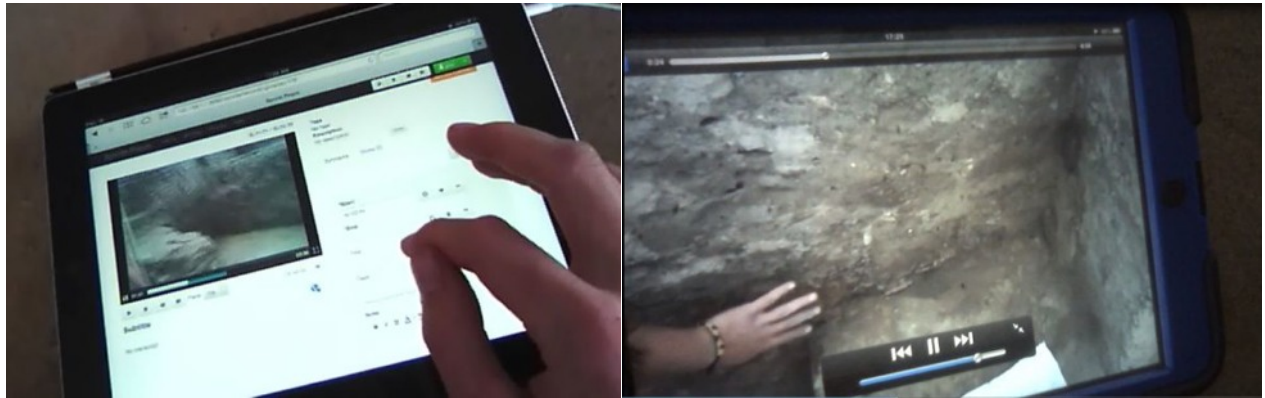


Figure 29.4. Instances of different viewing modes from the evaluation

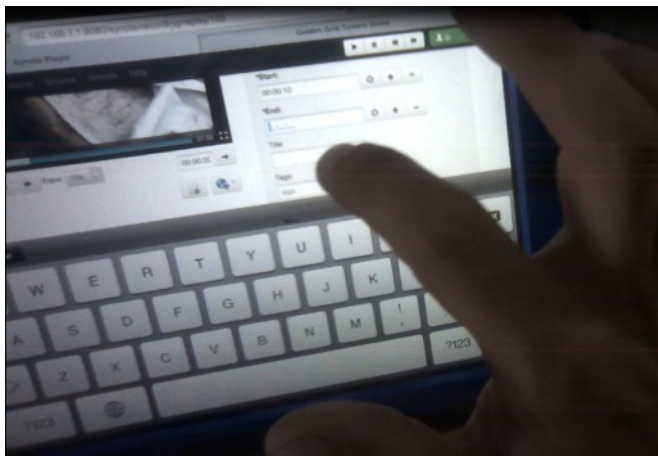


Figure 29.5. Instance of a user annotating a video.

Finally, the software offered a collaborative platform where multiple users could watch and annotate simultaneously the same video. Other utilities of the software such as creating and using transcripts, editing video recordings and linking to social media were available but not used during the study. The video annotation process took each participant approximately from thirty minutes to one hour to complete and was recorded by wearable devices to provide high resolution observations for the evaluation.

### ***Highlights from the evaluation***

The qualitative data gathered from the evaluations provided further insight about the value and the flaws of employing personal recording devices at fieldwork. We found that the main contributions of using wearable recording devices are related to the personal and mobile character of those recordings and the impact this has in archaeological fieldwork practises. A brief listing of the main themes identified follows.

### Benefits from the recording process:

Usability	The device that is easy to operate and robust enough considering the challenging environment in which it was tested. Looxcie is a hands free recording device. This enables archaeologists to record highlights of their on-going interpretation while being fully engaged in the excavation process, in conversations with peers and in performing other types of documentation.
Manpower	No extra people needed to set up and record.
Unobtrusiveness	The recording process does not interrupt the on-going fieldwork processes
Control and limitation of surveillance issues	Personalised recording. The user decides on the moments and the length of the recordings and can have control over the outputs. The fact that more than one recording device is available for synchronous use and that more than one person is in control of them significantly minimises surveillance issues.
User Perspective	The excavator's perspective. Usually on-site video and camera recordings bare someone else's perspective and not the excavator's. The wearable device records from a position close to the eyes of the user, providing an additional layer to the recordings; the intuitive perception of the environment as the archaeologist engages with it. Thus, it could be argued that the use of this technology for documentation brings the concept of 'interpretation at the trowel's edge' closer to the actual practice.

### Benefits from the revisiting and annotating process:

Introspection	Archaeologists can assess the on-going interpretation by retracing the elusive processes that took place as they occurred. This enables them to revise previous interpretations and/or make new observations based on <i>a posteriori</i> knowledge and the new information that come to light.
Managing and Annotating Video Data	The Synote application provided a user-friendly environment to parse larger video recordings and add contextual information where necessary.
Retrieving Video and Contextual Information	Video retrieval becomes less trivial and time-consuming with the innovative use of Synotes (bookmarks).
User-friendly Interface	The interface of Synote was reported as very user-friendly and overall the participants got familiar with the application's utilities and functions quite easily.
Collaboration	The Synote collaborative platform allows multiple users to access video recordings and the accompanying information that other users deposited and add their own notes. In result, the application showed more potential for collaboration than other methods (e.g. diaries) and prompted the exchange of views and interpretations.
Interpretation in a continuum of time and space	Video stands as a bridge connecting the current state with the previous state and the respective processes involved. Archaeological deposits and on-going interpretations are scrutinised within a continuum of time and space. Past with present and physical with digital.
Remote Presence	The specialists working in labs can revisit the process of excavation of certain contexts and finds.

Decentralised Workflow	At the core of the whole process of personal recording, is the decentralised workflow of video documentation; a fact which tackles to a certain degree known issues of centralised approaches that are extremely time-consuming.

Other Issues identified:

Mounting Mode	It was reported that the ear mounted device appeared to be a bit wobbly and at times irritating. Some users preferred to wear it only when they actually used it.
The 'Frame's Edge'	The perception captured by a position close (and not precisely) to the eye-level and the limitations of the camera frame (the Diagonal Field of View (FOV) is 65.5°) often results in off-set captures. However, the more users got acquainted and experienced with the device (from observing their captured segments) the better use they made. Second and third day videos present better coverage of the things that the excavator actually sees and talks about.
Awareness and Personal Behaviour at Fieldwork.	Participants reported that using such devices makes archaeologists more conscious about how they express themselves on camera, in terms of the way they communicate their ideas. They were aware that they no longer address the team members alone (where certain language codes have developed) but possibly other colleagues from the entire project. At once, most of the participants reported that their behaviour was not influenced much from the notion of existing recording devices.
Privacy and Monitoring Issues	Privacy and monitoring issues in academic environments were raised. However, it was generally admitted that these issues can be eliminated provided that each user has editing rights and control over which video segments can be stored onto the record.
Quality and General Efficiency of Data	Concerning the quality and general efficiency of data captured via Looxcie, participants rated the high resolution recording mode as more suitable for this type of documentation but at the same time they thought it lacked in terms of capturing fine details that are of great importance in archaeological documentation such as colour. Participants found video data more useful for revisiting 'in a visual manner the spatial distribution of raw fill (soil and scrap materials) in relation to the actual features (building materials) of spaces'
Timeframe for Handling Data	Archiving, annotating and revisiting personal videos are still quite time-consuming tasks even if the work load is spread across more people. However, we cannot ignore the potential of the method, given the benefits of a decentralised workflow for media-based documentation. In addition, the fact that during the study, personal video recording was not an established method (performed within the frame of participants' daily workload) may have influenced our observations.
Linking Data	It was reported that it would be preferable to be able to link different types of documentation to videos and annotations in order to have a holistic view of the subject under investigation and reflection.

## Future work

Overall, the evaluation demonstrated that personal recording could potentially be of great value to archaeologists and the interpretative process. One of the main challenges in making this medium more affective in fieldwork is to provide an intuitive annotation mechanism for the video segments to facilitate archiving and retrieving processes. Also, it is important to be able to link such data to the rest of the archaeological record since previous experience has shown that the lack of such linkages is the reason why such data are under-inspected by the team members. However, this issue touches upon broader database structure and linked data issues that are not going to be addressed in the framework of this study. Nevertheless, it was in the scope of this research project to address the issues of annotating and accessing video segments in novel ways. Our small scale evaluation of Synote will hopefully show that such systems are more appealing to researchers in archaeology, encouraging personal handling of video documentation and hence, intensifying video's active role in the rest of the archaeological record. Our imminent goal is to write up the results of our evaluation and communicate them to the PATINA Project partners and to our colleagues at Çatalhöyük Research Project, who have been engaged in the inquiry of reflexive methods in archaeology for many years and have produced important research finds on the topic (see previous Publications and Archive Reports, particularly Archive Report 2013, Reflexive Methodology – Åsa Berggren).

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### 30. Site Visualisation and Presentation 2013

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The 2013 field season represents the 5<sup>th</sup> consecutive year of work for our Visualisation Team at Çatalhöyük, and it marks the change-over of the majority of our contributors from the University of Southampton to the University of York. We arrived with a cohort of 11 people: six from York (Sara Perry, Ian Kirkpatrick, Katrina Foxton, Florence Laino, Erica Emond, Sian Jones), three from Southampton (Angeliki Chrysanthi, Graeme Earl, Hembo Pagi) and two from Ege University (Gamze Meşe and Özgür Uslu)—a mixture of lecturers, PhD, Master's and undergraduate students, and independent graphics and technology specialists. Our team members come from a variety of disciplinary backgrounds, including archaeology, cultural heritage management, tourism, fine art and digital humanities, and this diversity in perspective and expertise continues to make for a uniquely productive collaborative experience. That experience privileges critique, reflection, experimentation with inexpensive and locally-sourced materials, and blending of hand-crafted and digitally-rendered forms of making, as well as sharing of knowledge across cultural, professional and educational lines.

As described in previous archive reports, the Visualisation Team aims to elaborate Çatalhöyük's interpretative and presentational approaches both within the walls of the Visitor's Centre and across the site overall. We specifically work to (1) incorporate outputs produced by other site specialists and staff into our exhibitions (rather than produce everything anew ourselves); (2) develop concepts for displays through fully collaborative practice with visitors, guards, scholars, students and other interested parties; (3) manufacture materials in an inexpensive, do-it-yourself fashion that allows them to be modified and discarded as archaeological interpretations change and as public critique is collected; and (4) privilege pedagogy (i.e., learning how to research, make, evaluate and revise in an iterative and constructive manner) above fabrication of singular showpieces. This strategy commits us to long-term development rather than short-term overhauls, and as such, it can be uncomfortable, as progress is slow and mistakes are inevitably made when so many hands are involved in the process. Similarly, working between digital and analogue media, balancing respect for the setting with demands for new forms of engagement, and prioritising creative practice and craftwork, can be challenging and lengthy activities. True to the reflexive method at Çatalhöyük, though, these challenges always feed back into our work, altering our practice each year, elaborating our representation of Çatalhöyük, and adding to our substantial body of data on visitors and visitor perceptions of the site.

## Visitor Demographic

Çatalhöyük's site guards have been collecting basic data on visitor attendance since approximately 2002. These data include numbers of individuals arriving at the site, their country of origin, and – if based within Turkey – their city or region of residence. The recording of this information is done by hand in ledger books stored on site, and the rough nature of the system suggests that human error might affect the accuracy of the numbers. Nevertheless, the consistency of the data across the years indicates that any such errors are likely not to be statistically significant.

We reflect below on the visitor information recorded, in particular, between 2010 and end-of-June 2013. Of special interest is the recent rise in visitor numbers and the associated change in visitor demographic, which together seem to be directly correlated with Çatalhöyük's inscription on UNESCO's World Heritage Site list.

### Overall Visitor Attendance

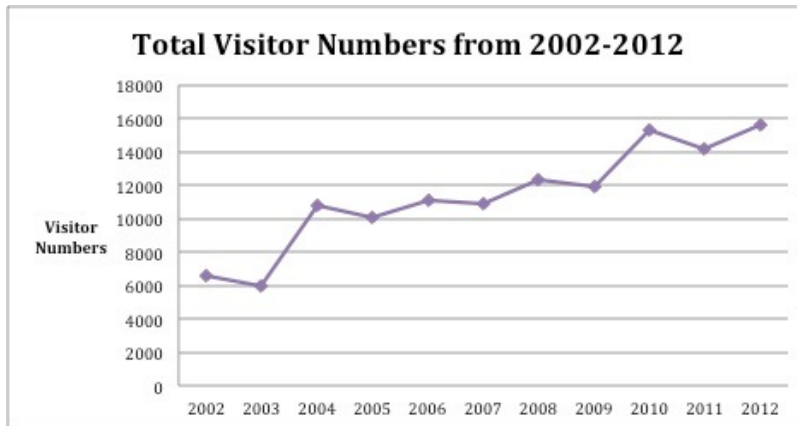


Figure 30.1. Total visitor attendance at Çatalhöyük (international and local) from 2002 until end of 2012.

Since 2004, visitor numbers have exceeded 10,000 people per year, with a conspicuous increase in 2010, when annual attendance began to hover around 15,000. A similarly conspicuous increase was evident in 2004, when numbers rose by 4000 visitors (from c.6000 per year in 2002 and 2003) (Fig. 30.1).

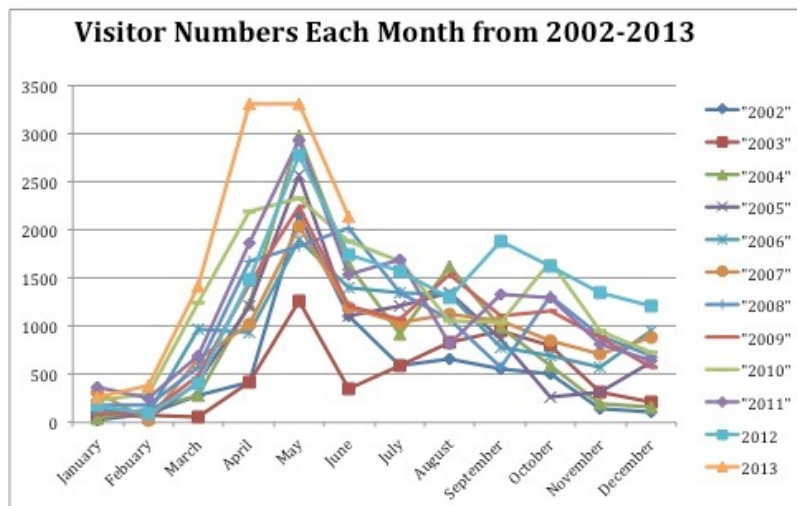


Figure 30.2. Monthly visits from 2002 to 2013.

### Seasonality and touristic trends

have clearly impacted upon visitor numbers, with lows in January and February, and peaks in April and May, and often in September and October as well (although to a lesser extent). Whilst these trends have been fairly consistent over time, there has also been an overall increase in visits in recent years across all months (Fig. 30 2).

This increase is especially noticeable in 2013, with an additional c.3000 visits in the first six months of the year (bringing the total visitor count to 10,794 for end-of-June 2013) compared to the previous three years (7761 for 2012; 7621 for 2011; 8144 for 2010).

### Changing Demographic

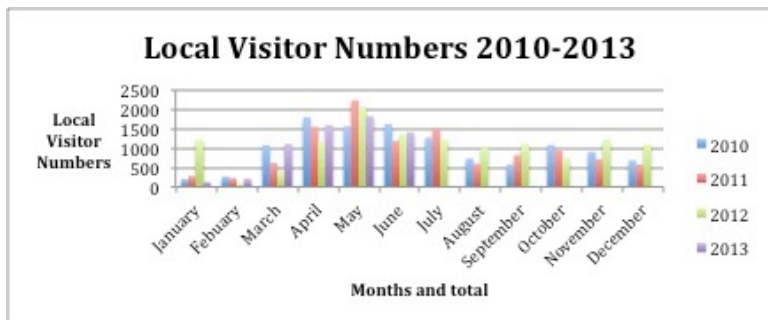


Figure 30.3. Visits by Turkish Nationals, 2010 to June 2013

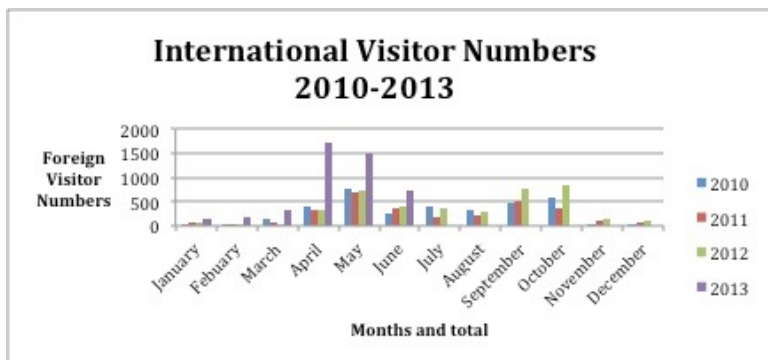


Figure 30.4. Visits by international visitors, 2010 to June 2013



Figure 30.5. International visitors mapped against Turkish Nationals for the first six months of 2013.

The past year has also seen a shift in the international versus local visitor demographic, ostensibly linked to Çatalhöyük’s World Heritage Site designation. While local visitors significantly outnumbered international visitors until 2012 – in the range of 75-80% local to 20-25% international – the data for 2013 indicate that these proportions are slowly beginning to converge (Fig. 30.3 & 30.4).

Indeed, in April 2013, for the first time since the recording of visitor numbers was initiated at Çatalhöyük, international visitors outnumbered local visitors, 52% to 48% (Fig. 30.5).

The majority of international visitors come from America, Germany, Japan, Australia, and Italy, with nearly 40 other countries represented to lesser degrees. In 2012, Americans topped the record books with 1157 visits, compared with 537 German visitors, 272 Japanese, 253 Australians and 197 Italians. However, in the first five months of 2013 alone, the international demographic seems to have shifted fairly notably, with 1456 Japanese visitors between January and May. This figure

exceeds the total number of Americans who visited across the entirety of 2012, hinting at a major change in touristic practice presumably linked to Çatalhöyük's UNESCO designation.

In comparison, during the same five month timeframe (January to May 2013), 406 Americans visited, 261 Germans, 165 Australians and 93 Italians.

We are now in the process of compiling all of the data from 2002 onwards in order to enable long-term analysis of visitor patterns at Çatalhöyük. These data will then be assessed alongside related (but separate) accounts recording the number of summer school students who visit the site (which seem to amount to upwards of 700 students per year).

### **Visitor & Staff Research**

Since 2009 we have been investigating visitor interactions with Çatalhöyük through a mixed-methodological programme of observations, interviews, questionnaires, and consultation with key site staff. This programme was extended in 2013 through continued written survey collection, an extensive series of interviews with site staff and specialists, and concerted examination of both Çatalhöyük's visitor log books and visitor comment books. Combined with analysis of visitors' spatiotemporal and photographic engagements with the site (see below), we have amassed a substantial body of data on people's experiences at Çatalhöyük.

This year, our team member Katrina Foxtan analysed a series of these data points against one another, looking at trends in visitor likes, dislikes and suggested areas for improvement at the site, as recorded variously in our on-site surveys, Visitor Centre surveys, and visitor comment books. For every data source, visitor responses were grouped into a number of thematic units, listed in order of frequency. Based on analysis of the on-site surveys (completed by visitors from a variety of nationalities), the most appreciated aspects of Çatalhöyük's presentation included:

- visibility of and access to the site's archaeological content (wall paintings/ bucrania/ burials/ excavation areas) (26 comments)
- seeing and accessing the archaeological work in process (15 comments)
- presentation of the site in the form of information panels, the experimental house, information on the mother goddess, and replica artefacts (12 comments)
- atmosphere of the site in general; particularly the quietness, peacefulness and lack of crowds (10 comments)
- the guides; their tours (6 comments)
- sense of being 'close to history' and being close to ancient remains (3 comments)
- the Visitor Centre in general (3 comments)
- accessibility of the site in general; i.e. the site's location (2 comments)
- overall operational aspects of the site, i.e. sponsorship granted to the site and historic investment in the archaeological dig (2 comments)

A smaller sample of Turkish national visitors who responded to questions specifically about the Visitor's Centre indicated that they most appreciated:

- Çatalhöyük's staff/guides and the work they do (11 comments)
- textual displays in the Centre including the fabric panels (7 comments)
- visual displays in general; in particular, the pictures and wall paintings (6 comments)
- specific content in the Visitor's Centre, including Mother Goddess information and artefact replicas (3 comments)
- the experimental house (2 comments)
- the cleanliness of the VC (1 comment)

In contrast, according to responses to our on-site survey, visitors (of both Turkish and international origin) expressed concern over several aspects of Çatalhöyük's presentation including:

- signage: lack of information in panels; a need to add and/or improve signs (12 comments)
- lack of language capabilities/lack of efficiency amongst the site guides (5 comments)
- difficulty in locating the site in the first place (i.e. signage issues) (3 comments)
- lack of tidiness on site (visibility of bins, dusty or dirty tracks) (3 comments)
- lack of clarity on content of the site (i.e. the burnt house and burials) (3 comments)
- concern for how the site will be preserved (2 comments)
- efficiency of displays in the Visitor Centre (broken video) (2 comments)
- the lack of sponsorship for an important site (1 comment)
- lack of artefacts in the Visitor Centre (1 comment)
- lack of ventilation in the North Area (1 comment)

On top of this, Turkish visitors, reflecting specifically on the Visitor's Centre, referred to their concerns about the:

- complete lack of original artefacts (3 comments)
- lack of on-site café and shop (2 comments)
- lack of information on panels (1 comment)
- malfunctioning video (1 comment)
- superfluousness of the guards (1 comment)
- lack of fees for entrance to the Centre (1 comment)

Within the on-site survey, both Turkish and international visitors were asked for their suggestions on what to improve in terms of Çatalhöyük's presentation. Their replies included:

- signage: More information should be given on panels, for example: historical detail, comparisons of the site to other sites, geographical positions, socio-economic life in the Neolithic; description of archaeological levels (15 comments)
- extra sensory interpretation: more physical, three-dimensional displays; more photographs; more up-to-date photos; interactive tools (audio guides) and films about excavation process in the Visitor Centre (11 comments)
- portable information: improve brochure; provision of Turkish guide book (4 comments)
- more information about artefacts found on site that are now in Konya Museum and elsewhere (2 comments)



- better directional road signs (2 comments)
- better provision of information by tour guides (1 comment)
- need for improvement of presentations in the Visitor's Centre (e.g., address tears on signage) (1 comment)

Beyond surveys, we have also begun to analyse the remarks left by visitors in Çatalhöyük's comment books. This season nearly 2000 entries spanning approximately 2.5 years were reviewed, and a selection of the more substantial and precise of these entries was coded into a series of thematic categories, in order of frequency. Importantly, we can see here parallel trends in terms of visitor likes, dislikes and suggestions for improvement. The most appreciated aspects of Çatalhöyük (beyond basic praise for the site overall) included:

- the overall presentation and provision of information, which led to a greater understanding of the site
- the organisation of the Visitor's Centre
- the visual displays in particular (including photos and wall paintings)

In contrast, visitors commented on their concern about:

- the lack of original artefacts
- discordance between the major significance of the site itself and its less impressive treatment in the Visitor's Centre.
- the lack of directions/good road signs to guide visitors to the site
- the lack of a tour guide
- the early closing times
- the lack of information in different languages

A variety of suggestions for improving the site were also provided in the comment books, including:

- extension of opening times
- wish to see more interactive or visual material, e.g. 3D visuals, more videos or a choice of footage in the Visitor Centre's and online
- better transport, including more regular buses between Konya and Çatalhöyük
- more rich historical information about Çatalhöyük
- inclusion of original artefacts in the Visitor's Centre
- more frequent cleaning of the Visitor's Centre
- more information on the site's world heritage status

Overall, the qualitative data indicate that there are significant improvements that might be made to the presentation of the site, from increasing the number of material objects, visuals and interactive/experiential displays, to providing better directional signposting on the roadways leading to the site. Such results are reinforced by related statistical analysis and computer-aided text analysis conducted by Angeliki Chrysanthi on these same datasets. The results of the analyses will be reported in more detail after another year of data collection, but preliminary work has been initiated to quantify visitor responses around, in particular,

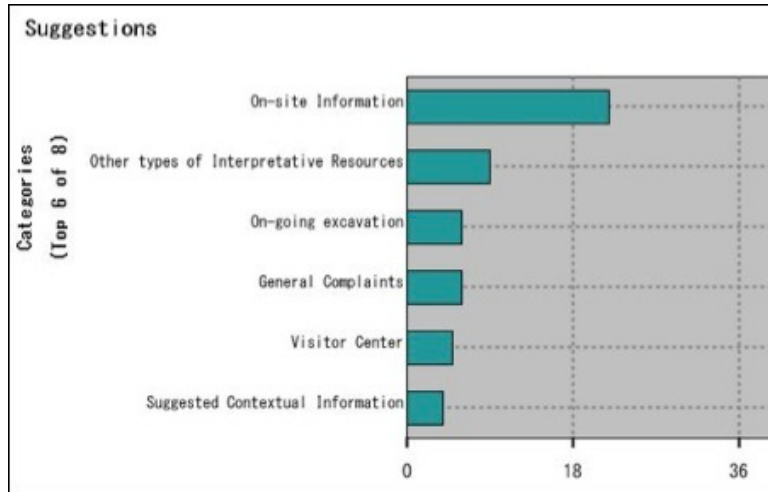


Figure 30.6. Most common visitor responses as regards suggested improvements to Çatalhöyük's presentation.

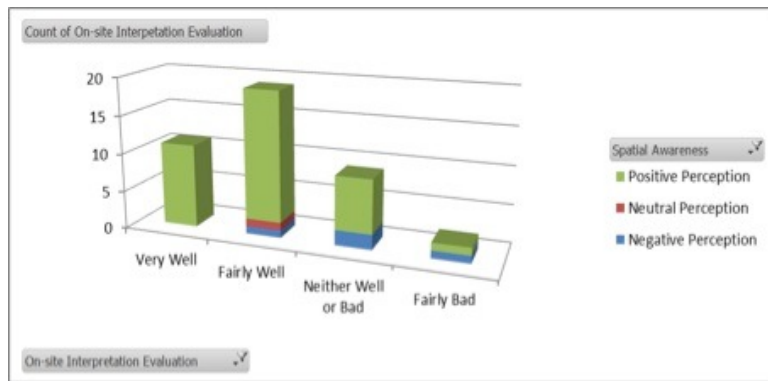


Figure 30.7. Graph illustrating the positive correlation between visitors' scores on spatial awareness and their evaluation of on-site interpretative resources.

suggested improvements to the site. According to the statistical review, the most frequently-recommended improvement related to provision of on-site information panels, followed by provision of other interpretative resources (Fig. 30.6).

Angeliki also examined the relationship between visitors' spatial awareness (measured on a 10-point scale) and the interpretative resources they used to understand and navigate through the site. In this instance, spatial awareness referred to how aware visitors felt they were of their location on the archaeological site. The analyses indicate that visitors who scored highly on spatial awareness simultaneously positively evaluated their interpretative resources (Fig. 30.7).

Using a mixed statistical analysis programme (combining descriptive analysis, regression modelling and cross-tabulation), the precise nature of the connection between visitors' perceptions of space at Çatalhöyük and their use of interpretative aids was studied. The results suggest that visitors accompanied by a guide<sup>3</sup> and/or a guidebook scored highly on spatial awareness and comprehension, in comparison to those using other interpretative resources (such as the existing information panels) who scored low or who demonstrated an insignificant impact. In addition, visitors accompanied by a guide reported the most 'interpretation satisfaction' in contrast to those who relied upon informational panels alone.

<sup>3</sup> Note that prior to 2013 international visitors had no access to English-speaking tour guides, and even in 2013, whilst a guide would always accompany visiting groups around the site, they may not have received an English tour, and indeed they may not have received any explanatory information whatsoever from their guide (in any language). The degree of engagement between guide and visitor depends on who is leading the tour, their multi-lingual competencies, and the wishes of the visiting parties themselves, amongst a variety of other factors.

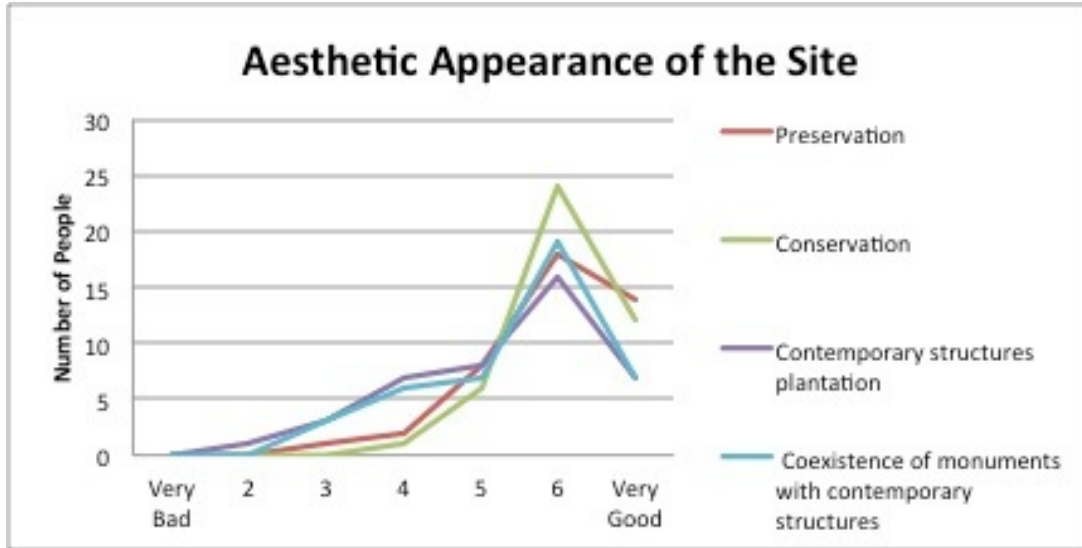


Figure 30.8. Graph illustrating how visitors rated certain aspects of the site in terms of aesthetics. Note: The 'Preservation' field broadly refers to how visitors rated the current state of the archaeological site and its preserved structures after excavation. The 'Conservation' field broadly refers to how visitors responded to the amount of on-site interventions implemented to protect the site from deterioration and to enhance preserved features. The 'Contemporary structures and plantation' field broadly refers to how visitors rated the contemporary structures and the landscape surrounding the archaeological site. Finally, the 'Coexistence of monuments with contemporary structures' field broadly refers to how visitors rated the fitting of contemporary interventions (such as shelters, on-site information panels, boardwalks, etc.) with the archaeological remains.

Visitors were also asked to score (on a scale from 1 to 7) aspects of the overall appearance of the site as regards issues of preservation, conservation, contemporary structures and landscaping, and the relationship between the archaeology and contemporary buildings on site (Fig. 30.8). Of especial interest is the fact that conservation efforts scored highly here, suggesting that the overall Project approach to conservation at Çatalhöyük is being positively received by visitors.

### Visitor Spatiotemporal and Photographic Data from Site Tours

In parallel to observations and questionnaires, we continued to collect spatiotemporal and visitor-generated photographic data in order to assess visitor perceptions and to further tease out visitor interactions with the archaeological site and on-site interpretive materials. Consenting visitors were supplied with a digital point-and-shoot camera and a portable GPS unit, and were asked to tour the site as normal, documenting their tour with the camera. This visual/spatiotemporal work has been ongoing since 2012, and will continue for at least one more year (into 2014), so as to ensure statistical significance. We will eventually cross-reference it against the finds from our observational data and questionnaire analyses.

What is critical, however, is the value of this methodology in monitoring changes in visitor flow and visitors' intra-site movements. Comparing the 2012 and 2013 sampled tracks it becomes apparent that visitor movement has been slightly modified in the SE section of the North Shelter (NS) area. In 2012, there was an information panel here which prompted visitors to



Figure 30.9. Visitor tracks in the SE part of the North Shelter area.

walk up to the area. Despite the fact that the sign was removed in 2013 due to certain reconfigurations of the excavation area and to ease visitor flow, the remaining path still prompts some (but not significant) movement to the east side of the shelter, where the archaeology has mostly been covered and where there is nothing meaningful in proximity for an untrained eye to view from that particular spot (see Fig. 30.9).

Also, the data provide further information about characteristics of specific tours of the site depending on the visiting mode (e.g., whether a visitor participated in a site guard-led vs. external tour guide-led tour). For instance, we were able to obtain descriptive statistics on the time that visitors spent on-site, the pace of their movement and the distance they covered (see Table 30.10). It appears that the average time visitors dwell at Çatalhöyük is approximately 40 minutes and their average visit covers just under a kilometre of walking at an average pace of 1.45 km/h. It is worth noting that the

Also, the data provide further information about characteristics of specific tours of the site depending on the visiting mode (e.g., whether a visitor participated in a site guard-led vs. external tour guide-led tour).

Label	Total Distance (meters)	Number of Trackpoints	Duration	Ave. Speed (km/h)	Guide ID	Area (acres)
S1	875,175	966	0:32:09	1.6	Guide 1	56,784
T3	960,470	1103	0:36:50	1.6	Guide 1	60,339
T5	806,906	901	0:30:00	1.6	Guide 1	55,914
T6	938,660	1468	0:48:54	1.2	Guide 1	60,612
T7	925,266	1048	0:36:17	1.5	Guide 1	55,956
T8	990,822	1386	0:46:08	1.3	Guide 1	59,702
T8a	890,971	975	0:32:28	1.6	Guide 1	56,832
T9	919,625	932	0:31:01	1.8	Guide 1	58,852
T10	1,044,666	1380	0:45:58	1.4	Guide 1	56,718
T11	951,006	1369	0:45:36	1.3	Guide 2	55,522
T12	803,444	877	0:29:12	1.7	Guide 3	52,733
T13	1,032,680	1262	0:42:02	1.5	Guide 1	60,251
V1	1,345,079	1228	0:40:54	2.0	Guide 1	58,067
V4	1,254,016	1045	0:34:48	2.2	Guide 1	59,559
V5	1,232,848	1440	0:47:56	1.5	Guide 1	56,358
V13	1,009,718	1592	0:53:01	1.1	Guide 1	56,961
V15	1,022,958	1434	0:41:19	1.3	Guide 4	58,394
V16	986,031	380	0:44:37	1.3	Guide 1	50,600
V17	635,218	751	0:42:16	0.9	Guide 1	68,837
V18	941,234	1781	0:59:20	1.0	Guide 1	60,515
V19	938,119	1767	0:58:51	1.0	Guide 1	58,770
V19b	728,927	605	0:20:04	2.2	Guide 5	52,821
V20	1,019,994	1681	0:56:00	1.1	Guide 1	57,605
V21	1,082,124	1780	0:59:18	1.1	Guide 1	56,927
V22	902,801	1007	0:33:32	1.6	Guide 1	59,928
V23	931,882	1243	0:41:24	1.4	Guide 1	55,991
V24	942,118	1173	0:39:04	1.4	Guide 1	56,133
V25	919,210	1222	0:40:42	1.4	Guide 1	57,772

Table 30.1. A sample of the data used for descriptive statistics.

minimum visit duration of approximately 20 minutes corresponds to group visits that have their own personal guide, and thus the pace and quality of visit appear to be quite different for these externally-guided visitors in comparison to those guided by the site's own guards.

Finally, the visitor-sourced photographic data verify our findings from our observational analyses and questionnaires. To provide a characteristic example, from observations and the statistical analysis of questionnaires it was ascertained that visitors appreciated the on-going excavation/conservation works and suggested that in future additions to the on-site interpretation, the project should include more information about archaeologists' methodologies, the technologies they employ and other aspects of their work. This aspect of visitors' feedback is also manifested in the photographic data, where despite a lack of signage on tools/techniques, visitors were often focusing their cameras on active archaeological practice (see Fig. 30.10). In the future, these photographs might be reverse-engineered into interpretative materials—used to guide the project in identifying those practical techniques that most grabbed visitors' attention and that hence might form the basis of written or other interpretation efforts.



Figure 30.10. Image captured by a visitor that demonstrates an interest in on-going excavation activities.



## On-site Signage

Redevelopment of the on-site signage has been on our task list for the last couple of seasons, as weathering, new excavations, and changes to the interpretative record have left the pre-existing signage obsolete. With the Project's anticipated completion in 2017, the long-term future of the site's presentation is also under consideration, meaning that we have been concerned not to invest significant money and related resources into materials that might be discarded in a couple of years' time.

After enquiring with the local print shops on costs for new signs, we were pleased to learn that these could be produced for as little as 15TL each. We began to plan content and a presentational strategy for both the North and South Areas (see below), but these plans were soon reconsidered when it became clear that national government specifications around archaeological site signage could now be enforced at Çatalhöyük. These specifications have profound impacts on on-site displays, as they mandate the use of large (almost 2m x 2m), concrete-reinforced signs, which would not only block views on to the digging areas, but would disturb the archaeology by necessitating excavation (to enable the laying of foundations for the signage frames). Given these problems, we prepared documentation to submit to the Turkish government outlining a proposal for low-cost and adjustable signage that was more sympathetic to the environment and consistent with our intellectual ideals and visitor preferences. The complexity of the archaeology, the depth and breadth of the finds and the evolving nature of the excavations together demand a flexible and non-permanent approach to information signs.

Alongside this proposal, the students, working closely with Ian Kirkpatrick (our graphic artist), the site guards, visitors, archaeologists and other site specialists, conceived, researched and designed various new signs for both the North and South Areas and the experimental house. These are among a series of informational panels that we intend to install over the next three years, most (following the extant model) 140 x 50cm in dimension, digitally printed on aluminium composite and affixed to moveable metal frames. Because those for the North and South Areas are now subject to government approval, we look forward to installing them in 2014.

The locations of each proposed sign for the shelters are mapped in Figures 30.11 and 30.12. The content for the five signs to be printed first is visualised in Figures 30.13 through 30.17 (note that the Turkish text awaits translation). The content for the experimental house sign is visualised in Figure 30.18.



Figure 30.11. Locations of new signs for 2014 for North Area (including 2013 additions).

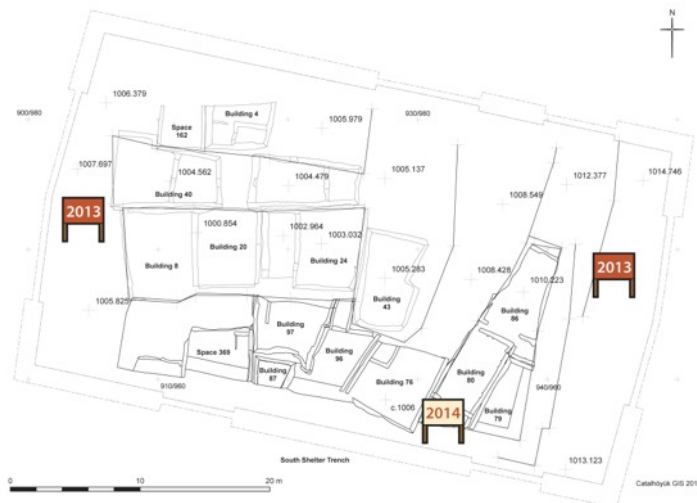


Figure 30.12. Locations of new signs for 2014 for South Area (including 2013 additions).

## Discovering the Settlement of Çatalhöyük

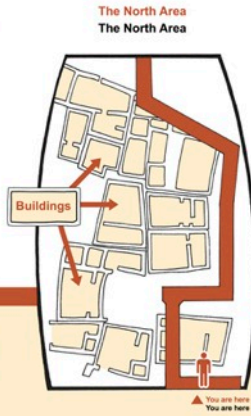
## Discovering the Settlement of Çatalhöyük

Çatalhöyük was built during the Neolithic, a time when people moved from hunting and gathering to living together in houses and farming the landscape. It is hoped that by uncovering the site, we might better understand why such changes happened in human history.

Archaeologists opened up this area (the North Area), excavating broadly to get a snapshot of a typical Çatalhöyük neighbourhood.

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### The life-cycle of a house

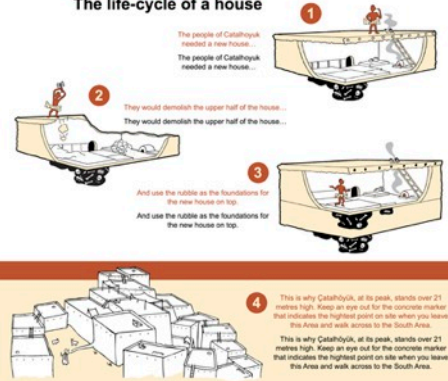
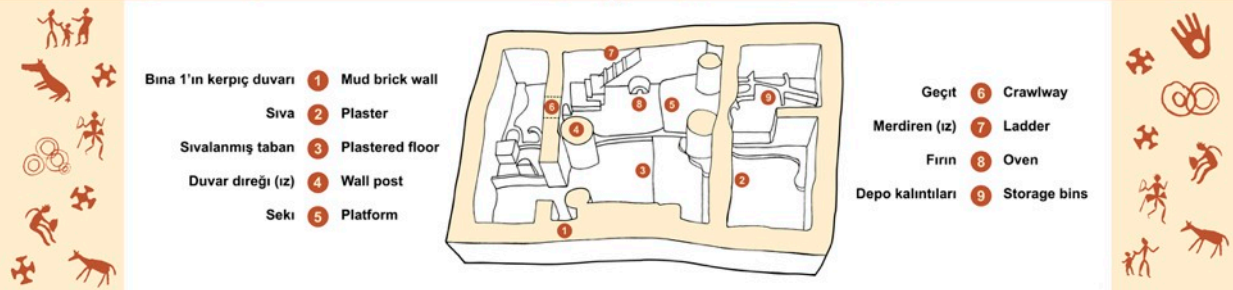


Figure 30.13. Proposed sign (North Area): Discovering the settlement at Çatalhöyük.

## A typical Çatalhöyük structure – Building 5

## A typical Çatalhöyük structure – Building 5



Archaeologists have been excavating here in the North Area of Çatalhöyük since 1995. The building before you was one of the first uncovered by researchers. If you look inside, you can see some of the key features that have been unearthed in homes all across the site.

Archaeologists have been excavating here in the North Area of Çatalhöyük since 1995. The building before you was one of the first uncovered by researchers. If you look inside, you can see some of the key features that have been unearthed in homes all across the site.

Figure 30.14. Proposed sign (North Area): A typical Çatalhöyük structure – Building 5.

## Uncovering the people of Çatalhöyük

## Uncovering the people of Çatalhöyük

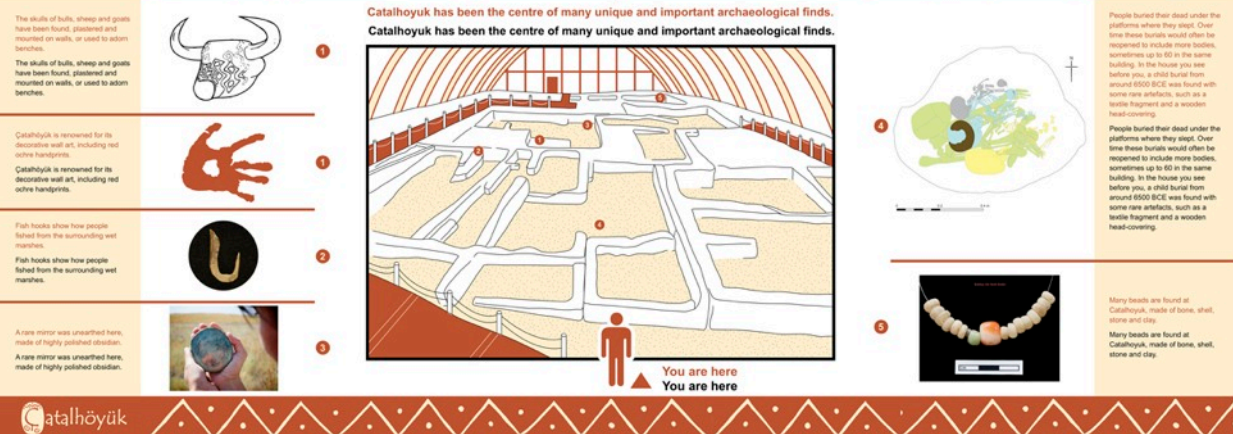


Figure 30.15. Proposed sign (North Area): Uncovering the people of Çatalhöyük.



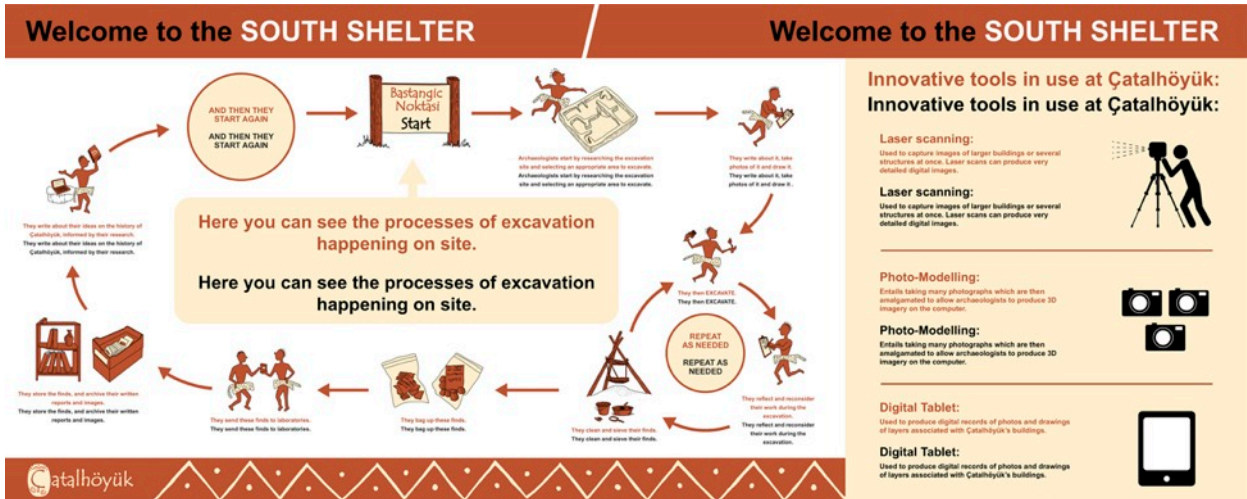


Figure 30.16. Proposed sign (South Area): Welcome to the South Shelter.

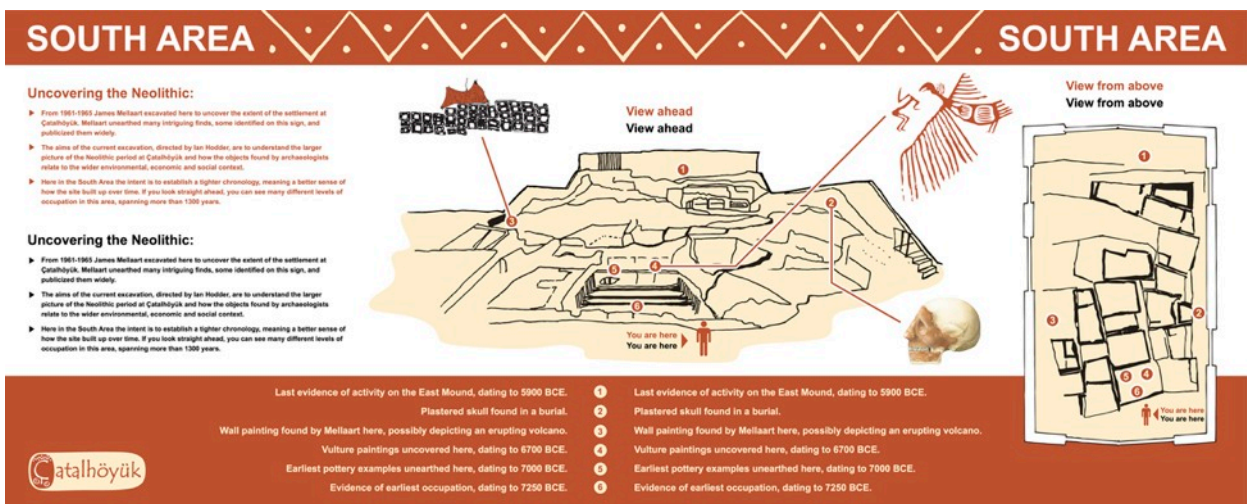


Figure 30.17. Proposed sign (South Area): Unearthing the Neolithic

DENEYSSEL EV

Çatalhöyük Deneysel Ev'ine hoşgeldiniz. Neolitik döneme ait bir evin replikası olan yapı, arkeologların Neolitik dönemde insanların günlük yaşantılarını nasıl sürdürdüğüne dair bilgi edinmesi amacıyla kullanılmaktadır. Ayrıca, Neolitik dönemde kullanılan; düşünülen yerel kaynaklar ve inşaat tekniklerinin deneysel olarak incelenebildiği bir çalışma ortamı sağlamaktadır.

Welcome to the Experimental House at Çatalhöyük! This replica of a Neolithic house is used by archaeologists to learn more about how Neolithic people carried out their daily lives. It is also an opportunity to experiment with local resource materials and building techniques that may have been used by Neolithic builders.

the EXPERIMENTAL HOUSE

**DENEYSSEL ÇALIŞMALAR**

**KERPİÇ TUĞLA**  
Üretimi

**FIRIN**  
Havalandırma Denemesi

**DUVAR RESİMLERİ**  
reproduktiyonu

**AYDINLATMANIN**  
etkilerini araştırma

Sekilerin altına **ÖLÜ GÖMME**  
denemesi

**EXPERIMENTS**

Building the...  
**MUDBRICKS**

The ventilation of...  
**THE OVEN**

Reproducing...  
**WALL PAINTINGS**

Testing the effects of the...  
**LIGHTING**

Experimenting with...  
**BURIALS**  
under the platforms

Figure 30.18. New sign for experimental house

### ***North Area***

The signage for both the North and South Areas has been designed to match their excavation philosophies. In this sense, the North Area signs aim to provide a snapshot of a specific neighbourhood at Çatalhöyük, whilst those in the South Area attend to the site's temporal depth and stratigraphic/archaeological complexity.

Flo Laino, with the graphic support of Ian Kirkpatrick, took responsibility for the planning and design of signage for the North Area. After consultation with the team, Flo opted for the production of three signs, addressing three separate scales of engagement with the site: the neighbourhood overall, the buildings, and the artefacts found there. The first of these signs uses Building 5 to help familiarise people with the basic features of a Çatalhöyük structure (Fig. 30.14). The second gives an overview of the shape of the Area, explaining how and why archaeologists are excavating there, and in so doing, helping to contextualise the archaeology for visitors (Fig. 30.13). The third showcases key artefacts within the North Area (Fig. 30.15).

### ***South Area***

Our research demonstrates that visitors are fascinated with the South Area as a vista—an impressive lookout point for understanding the depth of the site and the activities of the archaeologists. Accordingly, Kat Foxtan and Erica Emond, with graphic leadership from Ian Kirkpatrick, took responsibility for producing two new signs for the area focused on (1) excavation process, and (2) the development of Çatalhöyük over time.

The first of these (Fig. 30.16) aimed to simplify the archaeological process into a flowchart, attending to those activities that might be observed both on and off site (from digging to archiving to interpretation and reinterpretation of the evidence). Alongside that process, we were keen to draw visitors' attention to the new digital recording techniques being applied at Çatalhöyük, enabling visitors to recognise some of the electronic tools used by the excavation teams in the South Area.

The second of these signs (Fig. 30.17) was intended to make use of some of the successful informational devices that had been integrated into previous signage in this Area. Positioned at the bottom of the shelter, the panel allows visitors to place key finds from the site in their stratigraphic context, whilst also highlighting the depth and many levels of occupation viewable to visitors from this vantage point.

### ***Experimental House***

As research testifies to the long-standing popularity of the experimental house, it has been a goal to add signage to it to assist visitors in further understanding not only its role in representing an ideal Neolithic structure but also its role in testing out hypotheses about past use of Çatalhöyük's buildings. The degree to which the 'experimental' nature of the house is recognised by visitors is unclear, thus with this in mind, Sian Jones prepared a small single-panel, portable information board for installation inside the home (Fig. 30.18). We simultaneously wanted to explore the feasibility of using different types of signage at Çatalhöyük, and the experimental house has provided the testing ground for us.



The sign has been printed onto transparent plexi at a size that will allow visitors to hold it in one hand. It has been mounted onto the west wall of the house, via a chain, and sits in a bracket, inviting visitors to touch and interact with it. The longevity of this form of display is unclear, but its expense is so minor (15TL) that the investment is negligible in comparison to the potential to finally experiment with alternative means of on-site written presentation. Upon our return to site next year, we will assess its stability and decide whether to roll out similar designs in the future.

### Guidebook & Brochure

The Turkish version of the site guidebook was completed and sent to print this year, sponsored by Yapi Credi. Similarly, a necessary edit to the popular A4-sized site brochure was made, allowing the site guards to print it on site for distribution to visitors.

### Visitor's Centre

Various additions and updates to the Visitor's Centre were made this year, based on research with site staff, visitors and the archaeological team themselves. None of this work could have been completed without the support of Ian Kirkpatrick, whose graphic design and critical eye made the final outputs possible.

#### *Follow Me*



Figure 30.19. Sian preparing the new icon to guide visitors through the Visitor's Centre in a systematic manner.

Possibly the most playful of this year's new installations is a stylised icon (Fig. 30.19) designed by Sian Jones as a device to guide visitors through the Centre in a coherent manner. As per our team's previous reports, research testifies to visitors' often very erratic and unsystematic touring of the space, as well as their difficulties in finding an intelligible narrative amongst the varied displays. Drawing from the iconography added by Rachel Basinger to the alcoves in 2010, Sian produced a stencil of a character which she then painted along the bottom of the four walls of the centre, beginning at the entrance

where the character is accompanied by an invitation to "follow me". The advantage of this tool is not only its simplicity and comprehensibility by different audiences, but also the possibility of extending its use onto the site itself, the website, and other products designed by our team and the larger Project.

## Timeline



Figure 30.20. Erica next to the new timeline display on the east wall of the Visitor's Centre.

Following on from our 2012 work, Erica Emond took responsibility for redesigning the space at the far end of the east wall of the Centre. Previously, this area housed a contour map that was not only out-of-date, but also very difficult for non-specialists to interpret. In an effort to craft a more cohesive exhibition narrative in the Centre, we have been replacing existing content along the east wall with an introduction to the study of Çatalhöyük, including background on James Mellaart's and Ian Hodder's research programmes and a history of

the excavations. It was decided that a timeline, situating major finds from the site against its occupation history, provided the most cogent bridge between our previous additions, and the existing art reconstruction in the south-east corner of the Centre (Fig. 30.20). Moreover, this timeline now allows us to cross-reference with the new sign installed at the bottom of the South Area, asking visitors to look out for associated dates/finds that are highlighted outdoors—on the site itself. We are also able to add to the timeline in the future owing to the changeable and simple nature of the display – replacing our entries as new materials and revised dates come to light.

## Artefact Book

After concerns over the content of last year's Figurine Book were raised by members of the Project, Erica Emond took responsibility for rethinking it whilst also aiming not to completely discard the existing images which populated the book and its associated flash cards. The most logical course of action was to reconceptualise the display as an artefact book (and artefact-focused flashcards), telling the story of some of the artefacts themselves, their composition, histories and conservation by on-site specialists. This approach not only allowed us to salvage some of the previous content, but also presented an opportunity to better highlight the work of the conservation team and its direct relationship to the finds.

## Postcards

In 2011 our team collaborated in the production of a children's 'brochure'—a one-page A4 black-and-white print combining various activities for young visitors (e.g., connect-the-dots game, maze, colouring). Our research suggests that while these might have been popular, they

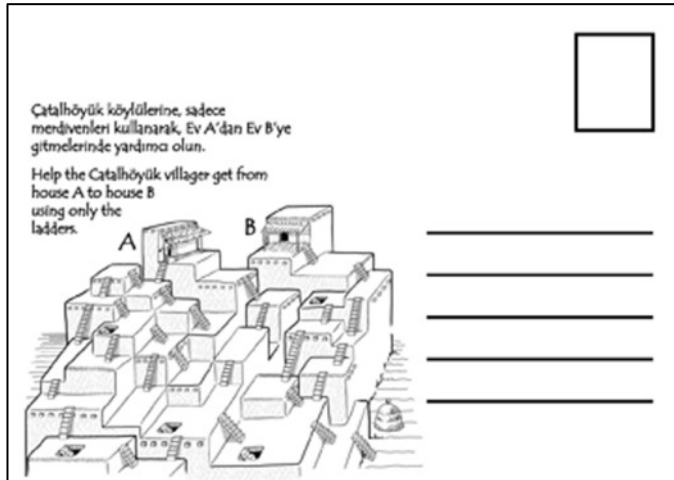


Figure 30.21. New postcard printed for free distribution to visitors.

were overly large and unwieldy and did not necessarily lend themselves to being taken home by visitors. Kat Foxtton suggested replacing the brochure with a postcard, which had the benefit of being portable and sharable, and which could incorporate some of the brochure’s activities into a smaller frame. Kat, with the graphic support of Ian Kirkpatrick, led the design and printing of the postcard (Fig. 30.21).

### *Images of Çatalhöyük Portfolio*

Several pages of additions were made to our free-standing Portfolio by Sian Jones this year produced by several of Çatalhöyük’s visualisers.

### *Texture Board*

The most ambitious of this year’s inclusions in the Visitor’s Centre was Flo Laino’s Texture Board (Fig. 30.22), whose concept was derived from observational critiques of the Centre conducted by our team upon arrival on site, alongside visitor feedback from earlier seasons. These critiques highlighted some of the major shortcomings of the space, particularly the predominantly text-based displays, the absence of real objects and tangible items on view, and the lack of child-friendly content. In response, a proposal was put forward to display reconstructed Neolithic materials for people to touch, inspired by the site’s artwork and related archaeological evidence.



Figure 30.22. New texture board installed in the south-east corner of the Visitor’s Centre.

It was hoped that this might help reinforce the information provided through the Centre’s surrounding signage/displays, but in a more obvious and palpable fashion.

In discussion with various site specialists, the content for the display was decided: conservator Ashley Lingle would supply reconstructed samples of mudbrick and ceramic; finds specialist Lisa Guerre would supply



reconstructed clay balls used in experimenting with the functioning of replica Neolithic ovens; Josh Sadvari from the human remains team suggested the idea of a Neolithic hand-print; and Flo herself proposed a string of beads to hint at the substantial number of such finds on site.

The display was constructed on a wall-mounted shelf, covered with textile, which we painted. The reconstructed objects were then secured onto tiles using heavy-duty glue and monofilament thread; the tiles were fastened to the shelf using brackets. True to our team's fluid and flexible principles, the design allows us to easily and individually remove each tile should we wish to update or otherwise modify it. There is some concern about the longevity of this display (i.e., its ability to withstand handling by thousands of visitors), but it stands for now as a proof of concept, which we will assess in full next year.

### *Photo Wall*



Figure 30.23. The site guards and visualisation team selecting photos for installation in the entrance hall.

Led by Kat Foxton, new photographs were hung in the entrance corridor to the Centre, complementing those that were installed by our team last year. This component of our redesign of the Centre has always aimed to prioritise the atmospheric and environmental/personal context of the site above explanatory text—to set the mood for visitors before touring the site itself. Continuing on with such an approach, and drawing from evidence

gathered by Kat and Erica in their staff interviews, three new photos were prepared. Of particular note: we were keen to include an image of the site's guards, whose role at Çatalhöyük is invaluable. With the help of Jason Quinlan, a series of photos of the guards were taken, and one selected (via an executive decision made by Mustafa) for installation in the entrance hall (Fig. 30.23).

A more problematic predicament presented itself with a different photo, selected from the archives to highlight the work of the human remains team. Unfortunately, in seeing the photograph (which gave prominence to a human skull) printed in large size, aestheticised, and presented without any written words to explain the intent of the image, our team made the executive decision to pull it from the entrance display. The potential that the photograph could

have been interpreted as sensationalistic or offensive or could otherwise have provoked concern amongst viewing parties, was too great to install it in the Centre. This decision is consistent with our ethical ideals and our team's methodological objectives. We aim to provide students with an opportunity to lead in the research and design of new materials, to experience critique from their peers and supervisors, and to reflect on and reconsider the validity of those materials upon their completion. In this instance, the final output did not match our goals, and after discussing the discrepancy, it was resolved to give the photo to the human remains team for installation in their own non-public lab space.

### *Costs*

Overall, our expenditures on equipment and supplies for both the on-site and Visitor's Centre installations amounted to approximately 255TL. Our printing expenditures amounted to 385TL. Together, then, our total expenditures for the season came to approximately 640TL, or about \$320 US dollars.

### **Digital Data Visualisation Work**

Our team member Tom Frankland returned to Çatalhöyük this year to continue his research examining whether a visual technological intervention could improve collaboration and awareness between members of the Çatalhöyük excavation team.

In last year's field season, he created multiple visualisations in different styles based on words and phrases extracted from the excavation diaries. These words and phrases were visualised in several ways: as network visualisations, with diary writers visualised as nodes and connected by links if they used a high number of shared words; adjacency matrix visualisations, which visualised individual words and their usage by writers in a table-style visualisation; and as tag cloud visualisations, which depicted the most commonly used phrases extracted from the diaries. These visualisations were deployed on a digital display located in the accommodation and lab block for around a week. Following this, interviews were conducted with the excavation team to determine the effectiveness of the visualisations. One of the most significant findings to emerge from the interviews was that many of the interviewees found the visualisations too complicated, and several people suggested that this had put them off entirely from engaging with the display. The interviewees also had a clear preference for the network visualisations compared to the adjacency matrices and tag clouds, often because of the interesting associations they spotted in these visualisations. The interviewees also liked how the visualisations helped them to identify other archaeologists they could engage with.

These findings were used to inform the design of a new intervention for the 2013 season. In order to reduce the overall complexity, this season visualisations were produced for each diary writer, rather than for the entire group. Furthermore, the content extracted from the diaries was reduced to include only the highest frequency words used by each diary writer. The technique employed to identify these words, referred to as term frequency - inverse document frequency (TF-IDF), produced a set of high frequency words that contained some terms that other writers would use frequently, and also terms unique to that writer. Once these keywords





Figure 30.24. An example visualisation produced from the 2013 research season.

were selected, network visualisations were generated for each writer. In contrast to last year, this year's deployment only used network style visualisations (Fig. 30 28). This style was chosen due to its appeal last year and also because the linked nodes in the diagram offered a visual representation of the project's aim, to stimulate conversation between two or more

connected writers. The visualisations also differed from the previous season by depicting high frequency words. The interviews from the previous season suggested that viewers desired more transparency in how the visualisations were created. Therefore each visualisation contained a node for each of the diary writers, a central node for the writer the visualisation is focused on, and smaller nodes for the top twenty keywords used by this diary writer. When other writers frequently used one of these keywords, nodes were linked together.

A display of these visualisations was deployed for approximately five days—relocated from its location in the 2012 season to a position nearer the entrance to the excavator's office space. This location provided more room for interaction in front of the display, and allowed peoples' interactions with it to be captured on film for future analysis. As was the case last year, the visualisations had mixed response among archaeologists. While many appreciated them, and enjoyed searching for their own names and connections, others felt that they were over-simplistic and consequently lacked any meaning or use. One issue which had a significant impact was the reduced number of diary entries submitted to the database at the time of the intervention, which meant that many of the keywords which linked diary writers were commonly used words such as 'trench' or 'find'. Consequently, various connections appeared trivial and did not encourage further exploration. However, at the same time, the display then prompted increased diary activity. One unexpected outcome was that diary writers began intentionally including unusual words in their diary entries to see if they would appear in the visualisations. While unintended, this playful appropriation of the visualisations might offers insights into how to increase future engagement with the diaries.

## Related work

Hembo Pagi joined us on site this year to assist Angeliki with the technical components of some of her research, and to continue experimenting with Reflectance Transformation Imaging in order to demonstrate its possibilities for the larger Çatalhöyük Project team. Hembo also worked with Jason Quinlan to process a series of 360° panoramic images produced in previous years. As there are more than 200 of these images available, there would appear to be much potential for their use in providing immersive experiences of the site to remote visitors (e.g., through the website).



Figure 30.25. The Çatalhöyük Visualisation Team (missing Graeme Earl and Tom Frankland), clockwise from top left: Katrina Foxton, Özgür Uslu, Levent Özer, Ian Kirkpatrick, Hembo Pagi, Angeliki Chrysanthi, Sian Jones, Gamze Meşe, Flo Laino, Yıldız Dirmiş, Erica Emond, and Sara Perry.

## Acknowledgements

We (see Fig 30.25) could not do our work on site without the support of a significant number of individuals—far too many to list here, but all who are integral to our activities and who are deeply appreciated by our team. We extend particular thanks to Yıldız Dirmiş, Levent Özer, Jason Quinlan, Katy Killackey, Ashley Lingle, Scott Haddow, Lisa Guerre, James Taylor, and especially the site guards İbrahim Eken, Mustafa Tokyağsun, and Hasan Tokyağsun.

## **31. Initial Interviews: First Steps Toward Assembling an Oral History of Excavation at Çatalhöyük**

Allison Mickel, Stanford University

### **Introduction**

During the 2013 field season at Çatalhöyük, I began research for my Ph.D. dissertation examining the history of excavations at Çatalhöyük, as recorded not only in the project's archives but also through the memories of those who have been hired to work at Çatalhöyük. The project archives include many various recording methods at Çatalhöyük including context forms, laboratory databases, diary entries, photography, video, and even social media; however, many of the people employed to work at Çatalhöyük have not participated in these documentation strategies. Their observations and perceptions have therefore never before been recorded. With my research, I intend to demonstrate the effect these circumstances have had on the archaeological record of Çatalhöyük more generally, and to show the level of complexity and completeness that could be achieved by broadening access to recording strategies at Çatalhöyük.

Over the course of four weeks at Çatalhöyük in 2013, I conducted 12 separate interviews with over 20 total men and women in the village of Küçükköy, asking specifically about their memories regarding the methods, findings, and experience of excavating at Çatalhöyük. For my dissertation, I will compare the information contained in these accounts with the archaeological research databases and archives of Çatalhöyük in order to determine how these two sets of data complement each other. After evaluating the nature of the information not generally recorded through the documentation methodologies employed at Çatalhöyük, I will be able to design a recording strategy that takes into account the types of data that have until now only been preserved in the memories and narratives of site workers and their families.

### **Methodology**

Interviewees were initially selected primarily by Numan Arslan, who was working as my interpreter during all of these interviews. Numan introduced me to the individuals with whom he had developed personal relationships through working together over the course of several field seasons at Çatalhöyük. These individuals in turn identified for us the men who had worked with James Mellaart in the 1960's still living in Küçükköy today. In general, most interviews were set up about a day in advance to ensure that participants were not inconvenienced or uncomfortable with the request for an interview.

After Numan and I introduced ourselves, I gave each interviewee an information sheet about my dissertation research and my status at Stanford as a graduate student; this sheet was usually explained to them verbally since literacy levels are inconsistent throughout the village. I began each conversation by asking about their role on the project, the artifacts they remember finding, what they meant, and what it was like to participate in excavations on site. Depending on their answers, I asked several follow-up questions, although frequently I did not have much

opportunity to do this as interviewees were generally eager to share their many memories and stories. The length of an average interview was about two hours, though they sometimes extended for longer. Interviewees were most comfortable when I was only taking notes rather than taping the conversations, although a few did agree to being video taped instead. The ultimate goal will be to record as many narratives as possible in order to contribute to Çatalhöyük's larger, permanent archive.

One major challenge Numan and I faced in conducting these interviews was scheduling; Numan and I are both pod leaders excavating at Çatalhöyük. We both spent most of each day digging, recording, and teaching students. Our interviewees were as well quite busy with their own work: tending fields, herding, cooking, housework, or running a shop. Furthermore, the 2013 field season coincided with Ramadan and almost all of our interviewees were fasting during the day, then enjoying iftar at night. It was difficult to find a time when we would not be interrupting these religious observances. Several times, the interviews took place while families shared their iftar meal with us. As a result, the number of the interviews we were able to schedule was limited to 12, although as mentioned above, the length of the interviews often compensated for this. The nature and duration of the interviews enabled me to forge closer relationships with these families and permitted a deeper, more complex understanding of the oral histories they related.

### **Preliminary Findings**

Analyzing the content of the interviews conducted so far, I have identified four key ways in which the oral history of excavations at Çatalhöyük complements the existing archives and databases. The first is through direct mention of specific finds or materials, which have often already been documented using conventional methods. Information provided by interviewees about particular objects or material types adds directly to the body of records already conducted and published including measurements, observations, and photographs. In particular, beads and necklaces were the artifacts most frequently remembered and described, followed by small vessels (translated as 'unguentaria'). Interviewees also often recalled details about individual obsidian tools and figurines they had recovered or even just observed. Less frequently, they mentioned burials, faunal remains, archaeobotanical deposits, wall paintings, bone tools, or specific stratigraphy. Interviewees could describe the size and appearance of the artifacts, along with their initial thoughts about the finds. In some cases, they described how the artifacts reminded them of familiar objects from their childhood or even how they reached realizations regarding the objects after their work on the excavation had concluded. They conveyed ethnographic parallels which many researchers could find useful in trying to interpret the evidence from Çatalhöyük. One noteworthy aspect of these conversations is the fact that interviewees frequently referenced objects in their houses—comparing their size, color, or function to finds from the site. This suggests that future systematic recording of these oral histories in order to create a permanent record should be done inside the workers' homes, using a format like video which could accommodate both the visual and audio aspects of these accounts.

Another field of data the interviews add to previous records about the site concerns memories of methodology, people, and the culture of the excavation. Çatalhöyük is unique in the amount of information that actually has been stored regarding these topics, due especially to the use of the diary database; however, as mentioned above, the people whom I have been interviewing have never participated in diary writing. The project's commitment to a multivocalic, reflexive, documentation of data collection necessitates soliciting contributions from team members living in Küçükköy who remember how decisions have been made about research procedure. The people I spoke to described different means they have experienced for assigning units or deciding when to sieve. Many people recalled various methods for making soil removal more efficient. One interviewee even explained, in detail, how small modifications in excavation procedure enabled workers to share their own expertise or prior knowledge with excavators and generating productive discussion, new ideas, and better informed interpretations. The same interviewee, along with others, reflected on how nuances of the excavation procedure impacts workers' investment in the research process and working relationships between archaeologists and site workers. Given that the Çatalhöyük Research Project has long recognized that data collection and analysis is entirely intertwined with the cultural and social dynamics of an excavation (Hodder 1997, 2000), this information represents a key lacuna in the documentation of the research process and knowledge production at Çatalhöyük.

Similarly, interviewees spoke a great deal about the process of learning archaeology, describing a constant, mutual teaching and learning relationship between archaeologists and local site workers which is rarely, if ever, documented in the databases or archives despite being critical to a full understanding of knowledge production and fact-formation at Çatalhöyük. Site workers talked about what they didn't understand before working at Çatalhöyük, how they learned specific skills and abilities, and the explanations given by specialists about artifacts or stratigraphy. Those who participated in Mellaart's excavations especially had a number of questions about the project that they didn't understand. Even site workers from the current stage of the process, however, described methods or findings that were never clear to them—in particular, functions of particular artifacts (stone tools and figurines, most commonly) and decisions about how or where to dig. They expressed enthusiasm and appreciation for times when archaeologists gave detailed explanations about the architecture, artifacts, and sitewide progress; this was done much more frequently and systematically in earlier years of the project and workers were unanimous in asserting the valuable skills and abilities they acquired from these exchanges. Equally, however, interviewees spoke about their own prior knowledge about Çatalhöyük, artifacts they immediately recognized as similar to items used in their grandparents' homes, original hypotheses about life in the Neolithic, as well as anecdotes about moments when they taught the archaeologists new information. They mentioned times when they demonstrated their ovens for specialists or described how they grind burnt wheat to make kohl, the purposes of bins, as well as methods for food storage. Although there are several examples where this kind of ethnoarchaeological information has been published (see Banu 2000; Matthews et al 1996; Shankland 1999), conducting these interviews represents an opportunity to make public the observations that the workers themselves feel is most vital, as well as their own ideas about life in the Neolithic. Workers outlined original theories about bodily ornamentation, functions of artifacts like clay balls and bone tools, and spiritual practices



at Çatalhöyük. One of the next steps of my project will be to find ways to present these interpretations and analyses alongside those already made public online and in print.

Finally, many of the interviews revealed what people who are employed to work on the site are most interested in learning about Çatalhöyük, along with what they would like to see as both research and tourism development proceeds. Several people expressed a desire to learn more about the mud-brick and architectural techniques at Çatalhöyük, along with laboratory analysis regarding the human remains at Çatalhöyük. Many people also mentioned that they hoped to learn more challenging, valued skills. One type of desired expertise mentioned explicitly was how to reveal wall paintings. Former excavation workers wanted to know as well more about the methods and outcomes of experiments conducted by Çatalhöyük researchers. Significantly, interviewees maintained that the information they were most interested in was also of wide interest to many people visiting the site. They made several suggestions for the role of the village in developing the site; one specific example was offering to cook food using only Neolithic techniques and local ingredients for tourists to experience Çatalhöyük in a direct, sensory way. This information is crucial on a pragmatic level; the people I spoke to were very direct and clear about their own priorities, giving serious, realistic, and carefully considered recommendations for the future of the site. Considering these suggestions, as well as including such additional perspectives in the formal Çatalhöyük research archive pushes the Çatalhöyük Research Project toward becoming increasingly inclusive, accessible, and relevant to its diverse stakeholders.

### **Future Directions**

In the interim between the 2013 and 2014 excavation seasons, I will further analyze the interview data already collected, especially as it complements the standard archaeological data recorded over the years of excavation at Çatalhöyük. Beginning next season, I will renew the ethnographic component of my research, conducting more interviews with the aim of gaining a fuller understanding of the local community's past memories and future hopes for the site. I will also continue systematically recording these narratives for integration with the project's main archives and databases. Ultimately, I will develop a system for presenting this new dataset alongside those previously recorded, as well as design a method for recording the kinds of information contained only in oral histories even as excavations are ongoing.

The aim of this research project is to add to the completeness and complexity of the archaeological record at Çatalhöyük by documenting aspects of the research process which has not been documented before now. It will add new, diverse perspectives to the layers of multivocality already established by the many varying strategies for data collection employed on the Çatalhöyük Research Project. Particularly as the project looks toward finding productive and effective ways of establishing a permanent archive for the archaeological data recovered at Çatalhöyük as well as developing the site for tourism, it becomes increasingly crucial to include the perspectives of the team members who live near and engage with the site year round. The interviews conducted so far represent a preliminary step toward promoting this kind of dialogue.

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