ÇATALHÖYÜK 2011 ARCHIVE REPORT

Çatalhöyük Research Project

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Archive Report 2011 compiled by Shahina Farid
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Cover – Sarah Gonzaga exposing wall painting in B.80. Photo Jason Quinlan

2011 SEASON REVIEW

New painting found at Çatalhöyük – Ian Hodder

A new 9000 year-old painting has been found at Çatalhöyük this summer. A Turkish and international team has been excavating again in this early town. In one of the houses (Building 80) in the town the walls still stood 2.5m high. The walls had been plastered in a white clay (Figure 1). In the middle of the east wall in the house there was a red-painted niche in which we found a cache of obsidian points.

Figure 1. General view of white plastered wall in Building 80 at Çatalhöyük. Photo Jason Quinlan.

On a wall panel below this niche we gradually removed layers of white plaster (see cover). At Çatalhöyük people replastered their walls every month or so, in order to stop the walls being covered in soot and smoke from the hearth and oven in the house. So we have been taking off these micro-layers of plaster one-by-one (Figure 2). In the panel below the niche we discovered that the wall had been painted and that the red paint was still very fresh.

Figure 2. Uncovering the painting at Çatalhöyük. Photo Jason Quinlan

The design is very interesting – but also very difficult to interpret! Is it just a geometric design or is it a picture of something? As a geometric design it has regular vertical divisions. But it is tempting to see the design as representing bricks (Figure 3). The whole of Çatalhöyük is made of unfired mudbricks and the painting could be showing these; is it possible to interpret the painting as brick walls or brick pathways across the roofs of the town? Paintings at Çatalhöyük are often difficult to interpret but this one is particularly intriguing.

Figure 3. Detail of design in painting showing 'brick' motif. Photo Jason Quinlan

In the current phase of the project we are attempting to understand the overall social geography of the site, how it was organised ritually, socially and economically. Equally important, we aim to conserve and present Çatalhöyük to a wide audience and to engage different stakeholder communities in its care. Çatalhöyük is on the UNESCO World Heritage Site Tentative List and it has recently been put forward by the Turkish Ministry of Culture and Tourism for inscription on the full list. We are working with the Ministry to try to ensure that the application to UNESCO is successful.

140 researchers and students and 16 local workers took part in the 2011 season over the period from June 28th – August 26th. The team came to Çatalhöyük from Britain, the United States, France, Germany, Canada, Serbia, Australia, Poland, Italy – in fact 16 different countries. All these people came to join Turkish colleagues working at the site. The new Assistant Director is Serap Özdol from Ege University.

The team was all very excited by the new painting in Building 80 and the various possible interpretations. In fact Mellaart had found a similar painting in his excavations in the 1960s, in what he called Shrine VIA.50 (see Figure **). This occurred at about the same time as the new Building 80 painting, and there are a number or remarkable similarities, not confined to the use of a diagonal 'brick' design. For example, the VIA.50 painting is again in the middle section of the east wall, and it has a bench to the south with a single pair of bull horns as in Building 80. In addition, the Mellaart painting has frequent vertical lines with triangular lobes. The paintings are indeed so similar that they could have been done by the same painter; at the very least the artists must have been aware of the other painting. Building 80 and Mellaart's 'Shrine' 50 are not close to each other; they are about 35m apart and in separate clusters of buildings. So the new painting helps us to understand the social geography of Çatalhöyük, reinforcing the impression gained from other data that there were widespread social and ritual networks across the community, binding it tightly together.

Figure 4. Painted calf's head above niche and platform in Building 77. Photo Jason Quinlan

A further aspect of the painting confronts our assumption that it was to be looked at as 'art'. As the team gradually peeled back the layers of plaster they found that the painting was not all on one plaster surface. Part of the painting would be found on one level, but another part would be found one layer down. And in one case the layers of painting were separated by over twenty layers of unpainted

plaster. Wherever we found layers of painting separated by unpainted layers, the lower and upper painting always followed much the same design and position. Somehow the artist had 'remembered' the earlier painting as it was renewed in later months and years. It seems as if the painting was not a static thing at all. From time to time people covered over parts of the painting, but not all of it, and then later (sometimes much later) repeated the same design, or renewed it. It seems as if the painting was more a process than a static thing to be looked at as 'art'. Whatever the meanings of the painting, they were embroiled in the practices of covering and renewing.

Figure 5. Row of painted hands in Building 77. Photo Jason Quinlan.

Another exciting find this year has been a young calf's head with horns attached that had been painted red and installed in another house (Building 77) over a niche surrounded in red paint (Figure 4). In this case the animal head was set in the wall above a platform under which we have found over 9 burials and more are to be excavated. The people of Çatalhöyük always buried their dead beneath the house floors, but there was a particular concentration of burials beneath the painted calf's head. There were other paintings around this platform, including a row of red hands (Figure 5). We often seem to find paintings surrounding the areas of the house in which people were buried. Perhaps the paintings allowed communication with the dead in some way. We had found paintings associated with burial platforms in Buildings 1, 3 and 49, and now in Building 77. We have not yet excavated through the platform in Building 80, but the central eastern platform is often the one that contains burials at Çatalhöyük. And it was above this platform in Building 80 that we found the 'brick' painting. So it is possible that the Building 80 painting was again associated with burial in some way.

OTHER ACTIVITIES – Shahina Farid

Publication Study Season

During the excavation period on site laboratory and excavation teams worked on final draft chapters for three of the four new volumes being prepared for publication in 2012/2013 by the Cotsen Institute in UCLA. These volumes deal with the excavation and laboratory results regarding human populations in the Çatalhöyük landscape, and with the material artefacts in the 2000-2008 period.

Figure 6. Team seminar on theme chapters 2011. Photo Jason Quinlan

In addition, the team held a series of seminars discussing themes generated from the integrated data collected during the 2000-2008 period (Figure 6). The themes discussed were: Public presentation, Landscape and mobility, Storage and sharing of food, Constructing buildings, Abandonment and closure, Inside/outside, Social and settlement organization, Temporal change, Paintings and change through time, Personal adornment, Questions of scale, Seasonality and others. These themes will form chapters for the fourth volume planned for publication in 2013.

Templeton seminar

From 28 to 30 July we hosted a seminar of international researchers in archaeology, anthropology, sociology and religious studies. The aim of this seminar was to discuss the role of power and property in the development of early settled life, and to discuss the role of ritual and religion. The aim is to situate the work at Çatalhöyük into a wider intellectual frame, and in relation to knowledge about early farmers in other parts of the Middle East (Figure 7).

Figure 7. Templeton seminar series team on tour in the South Area with Shahina Farid. Photo Jason Quinlan

The attendees were Stewart Guthrie, Kimberley Patton, Harvey Whitehouse, Barbara Mills, Victor Buchli, Mary Weismantel, LeRon Shults, Wentzel van Huyssteen, Ian Kuijt, Nigel Goring-Morris, Anna Belfer-Cohen, Peter Pels, Anka Kamerman, Rob Swigart. In combination with each other and with the team of archaeologists, these participants presented a series of papers dealing with the main questions of the project. The discussions were wide ranging and successful and it was decided as a result to publish a new book on the theme of the seminar to be entitled 'Vital matters'.

Ritual Community and Conflict Project

A related project funded by the Economic and Social Research Council in the UK through the University of Oxford is directed by Professor Harvey Whitehouse and deals with the role of ritual in the early development of societies (see Ritual Community and Conflict Project). During the 2011 field season at Çatalhöyük, Harvey Whitehouse, Dr. Quentin Atkinson and Oxford-based researcher Camilla Mazzucato worked on site for two weeks. The main objective of the 2011 field work was the definition of a series of quantifiable variables whose change through time can be used to assess the evolution of ritual forms and social structures. In order to have the broadest picture of the evolution of social and ritual dynamics, all time periods and excavated areas on the East and West Mounds have been taken into account. Data-mining of the various Çatalhöyük excavations and laboratory databases, as well as discussions with team members have been used to identify a number of relevant variables.

Shell Press Day

A press day was hosted by Shell on the 30th July. Shell has been a generous supporter of the project for many years, which has facilitated much of our work to date. In recent years Shell has provided additional support for the Childrens' Summer School (see Summer school Workshop Report), which has enabled this very important project to continue and develop into the format that it is today. From a focus that had been on children in the early years the project now involves officials such as highway workers, the National Education Ministry and civil community organizations to disseminate the importance of archaeology and the future care of cultural and historic sites.

Figure 8. Press day organised by Shell on tour with Gulay Sert. Photo Jason Quinlan

There is no doubt that without the continued support from Shell the Childrens' Summer School could not have continued in its present format. It is unsurprising therefore that the Shell press day at Çatalhöyük in 2011 focused on the Childrens' Summer School activities (Figure 8)

Media

In addition to the media coverage of the Shell sponsored press day, we had regular coverage of our work from local media groups. A number of TV documentary groups also filmed at the site. We were very excited to host and facilitate Andrew Marr for a major BBC documentary series called "Andrew Marr's History of the World" (Figure 9). Another BBC team filmed on site for a documentary entitled "Women in Religion" presented by Bettany Hughes. Atlantic Productions were commissioned by The National Geographic Channel to produce a documentary about Göbelki Tepe for which they also filmed at Çatalhöyük with Tristan Carter, on the similarities of symbolism at the two sites and current interpretations.

Figure 9. Andrew Marr guided around Building 5 by Shahina Farid for his BBC documentary 'History of the World'. Photo Jason Quinlan

Other film crews came from Sweden, France and Japan. From Sweden Martin Widham, Director of Science Documentaries filmed for a documentary on the origins of conflict and violence towards seeking an understanding of 'war'. A similar topic was covered by Philip Hendel, an independent documentarist from Paris seeking to elicit the determining factors of war. A Japanese film team covered the topic of the origins of the Mother Goddess as part of a documentary following her through history. The project was also featured in an article by Susanne Fowler in the New York Times, entitled "Into the Stone Age With a Scalpel: A Dig With Clues on Early Urban Life", published September 7, 2011

Figure 10. IT officer Rich May revisits his archaeological skills - cleaning in the 4040 Area. Photo Jason Quinlan

Tours & Visitors

As every year we hosted a number of visitors and visiting scholars through the season. 14 visitors stayed with us on site for the allowed period of time for assessment of future research projects and collaborative programmes. A number of planned tours were given to groups organized by the Turkish Cultural Foundation, Peten Travels and the Global Heritage Foundation. We were also visited by a number of excavation teams from other projects working in Turkey including Kamen Kale Höyük and Boncuklu Höyük. Finally we were especially pleased to have hosted Greg Pepin of Boeing and his wife Cheri, and Aysegul Ildeniz and her team from Intel.

Remedial work

In addition to on-going conservation work of newly excavated structures and artefacts (see Conservation Report), cleaning and remedial work is always required to previously excavated areas and structures that are on display (Figure 10). Long-term issues that arise from display on archaeological sites is that maintenance has to be on going, not only to the archaeology that requires seasonal cleaning of dust and residue of slow erosion of plaster and mudbrick but also includes intervention to arrest larger areas of damage that differing seasonal micro climates creates. Furthermore the display structures require monitoring for deterioration over time such as discolouration, rust and dust as well as problems of burrowing animals, plant growth, insects and cobwebs. Weather conditions that affect the external and internal environment can never be predicted such that constant reconfiguration of placed drainage solutions need constant monitoring and reconfiguring. The microclimate is ever evolving and can never settle to one state so impact statements and mitigation strategies have always to be under scrutiny.

In the South Area therefore large areas of exposed sections were reviewed and banked up with soil filled sacks as a precaution against erosion and collapse (Figure 11).

Figure 11. Soil filled sacks banked up against exposed sections as a precaution against erosion and collapse. Photo Shahina Farid

Figure 12. Bespoke stair at one of the visitor entrances to the South Area. Photo Shahina Farid

A much-needed bespoke stair was erected at one of the visitor entrances to the South Area (Figure 12) and another replaced one to the 4040 Area.

Figure 13. Mini replica shelters to monitor internal environment conditions. Photo Shahina Farid

Another issue currently under review concerns on-going problems with the environment created by the North shelter that is causing problems both for the mudbrick structures as well as the working conditions. Relative humidity and temperature levels fluctuate constantly in different parts of the shelter causing damage to the mudbrick and plasters. Unlike the South shelter that sits semi protected on the slope of the southwest flank of the mound, the North shelter is completely exposed on the top of the north prominence where it is subject to the elements and in particularly the strong northsouth wind flow. The main solution identified has been to change the cover to a material that will create a more stable internal environment but also to modify the location of the vents and openings that will create ventilation but without a 'wind tunnel' effect.

In order to identify the best solution a monitoring system was set up in at the end of the 2011 season. Three model shelters were assembled, one that replicates the material used on the current shelter whilst alternative covering materials and internal modifications are represented in the other two

(Figure 13). A Hanwell monitoring system using dataloggers has been placed in the 3 model shelters that will serve to identify which of the three options creates the most stable internal environment and thus minimise the problems.

ACKNOWLEDGEMENTS

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

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Main Sponsors

Other sponsors 2012

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Residue Sorters:	Hatice Çelik, Fadimana Sivas, Saliha Sivas, Hatice Yaşlı, Hatice Tokyağsun.

Figure 14. Team Tour of the South Area Excavations. Photo Jason Quinlan

EXCAVATIONS

Introduction to the Excavation Areas 2011– Shahina Farid

There were two components to the 2011 season. One was to complete the writing of reports for publication that the excavators and laboratory teams had been working on summarising results from the work at the site between 2000 and 2008. In this post-excavation phase (2009-2011) 4 volumes for publication were under preparation and over the summer in 2011 final chapters for 3 of the volumes were written. Discussions for the fourth thematic volume also took place.

The other aim was to continue excavations on the East and West Mounds. On the East mound excavations were conducted in the 4040 and South Areas, and the Chalcolithic levels on the West Mound continued in Trench 5. (Figure 15). The Summer School programme (see report below) also continued excavations of the 1960s spoil heap known as the REC (Recycled) Area (for background to the excavation areas, aims and objectives see previous Archive Reports).

Excavations in the South Area continued from the previous season's work on the southern ledge where work focused on buildings and external areas to bring the group into a roughly contemporary horizon (Figure 16). This included Building 97 that had been first exposed in 1962 as E.VIB.28 and where some work had been conducted last season. To the west were a series of external areas of finely lensed midden and trampled surfaces excavated last season as Space 369. To the east work began in Building 89, which was defined in 2009 below Building 76 (see Archive Report 2009). Finally unplanned work took place in Building 80 on the exposure of a wall painting on the east wall.

South Area

Building 97 – Spaces 365 & Sp.469 – Lisa Yeomans

Supervisor: Lisa Yeomans*
Assistants: Darko Maricevic*, Kate Rose (1). Onur Yüksel (3) Theodore Arnold-Forster (4), Alison Mickell (4)

*Çatalhöyük Research Project, (1) Stanford University Field Team, (3) Selcuk University, (4) Independant

Introduction
Building 97 was re-exposed last year (see 2010 Archive Report) having been originally excavated down to the latest floors in the 1960s and designated E.VIB.28 in these original excavations. Backfill was dumped into the building in the 1960s and this was removed last year to expose the building, the latest phases of which had suffered from erosion and cracking of the archaeological deposits. The building comprises of a main room (Sp.365) with platforms along the eastern side and by the end of the occupation of the building, platforms along the northern wall. The northern wall was substantially eroded and only a thin slither of the wall survived showing the original size of the room. The southern part of the room was where the food processing took place and contained a series of ovens and hearths. The western side room (Sp.469) was divided by a partition wall from the main room with bins at the southern end (Figure 17). According to Mellaart a further storage room was located to the north of the western side room but this area of the building was completely truncated by the 1960s excavations. The end of B.97 is marked by a fire episode that damaged the northeast corner and especially the northwest corner of the building where the fire spread along the timber in the partition wall.

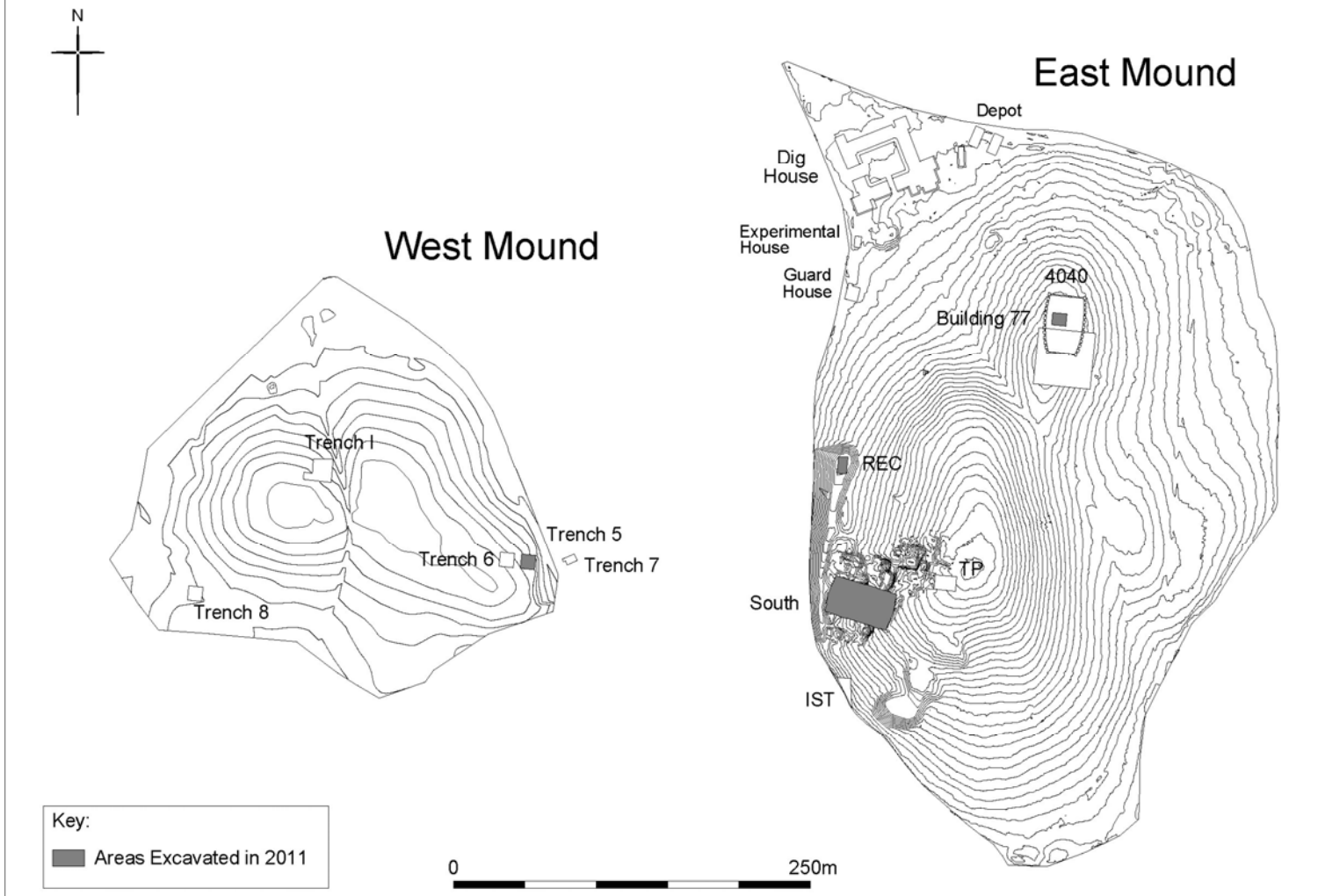

Figure 15. Areas excavated 2011 season. Plan David Mackie

In 2011 the excavation of the occupation deposits from B.97 showed that the building contains a complicated stratigraphic sequence with the internal features constantly undergoing re-modelling and being replaced. Overall the layout of the building remained similar but eastern platforms and the partition wall were constantly added to and repaired. The storage bins in the southwest corner were repeatedly knocked down, infilled and replaced with new storage bins and the cooking area was modified by replacing the oven and eventually replacing it with a sequence of hearths with the additional space created allowing the construction of a southern platform which itself was remodelled a number of times. Three burials were excavated from the central floor area and a neonate was interred in the northeast platform during the time that the stratigraphic sequence excavated accumulated. The occupation sequence was not fully excavated and there remains a considerable sequence to be excavated next year.

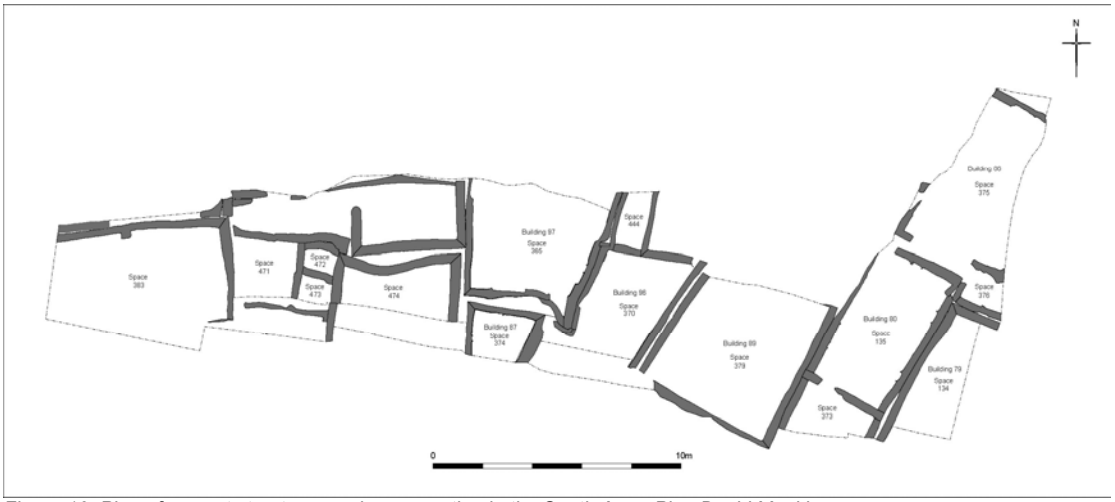

Figure 16. Plan of current structures under excavation in the South Area. Plan David Mackie.

Central floor area

As the excavation of the building is ongoing and the phasing is not complete the sequence of modelling in each area of the building is described but these have not been assigned to overall building phases as yet. The stratigraphic sequence of the central floor area is tied into the phases of eastern platform extension and the development of the partition wall separating Sp.365 and Sp.469. The earliest feature (F.3540) excavated in this central floor area was a truncated juvenile skeleton (19670) that had been buried just to the west of the northwest platform close to the north wall of Sp.365. All that remained of the burial was one articulated limb with most of the burial removed by the later interment of burial F.3534, skeleton (19635). F.3450 was sealed by a compact surface make-up layer below (19645), which comprised or between 4 and 6 layers of thin plaster surfaces and make-up layers extending across the central floor area. These were very patchy and worn from use except by the northern wall where they could be seen in section as surviving better.

Burial F.3534 truncated these floor layers and contained the skeleton (19635) of a juvenile lying on its left side in a crouched position (Figure 18). This burial was also located in the northeast corner of the central floor and truncated the earlier juvenile burial. The burial was sealed by a further thick floor make-up layer (19629) raising the central floor area by approximately 60mm and covered by layer (19600), which comprised of two thin plaster layers separated by a thin make-up layer. The final burial in B.97 truncated this floor. This burial (F.3522) was located in the northwest corner of the central floor and contained a tightly flexed adult female skeleton lying with the head to the west and lying on her back and slightly leaning onto the right side with the knees tucked up under the chin (see Figure Human Remains). As with the other burials the cut for this interment was sealed by a thick make-up layer (18646) over which the northern platforms were constructed towards the end of the use of the building. The latest plaster surface (19639) in the central area abutted the northern platforms.

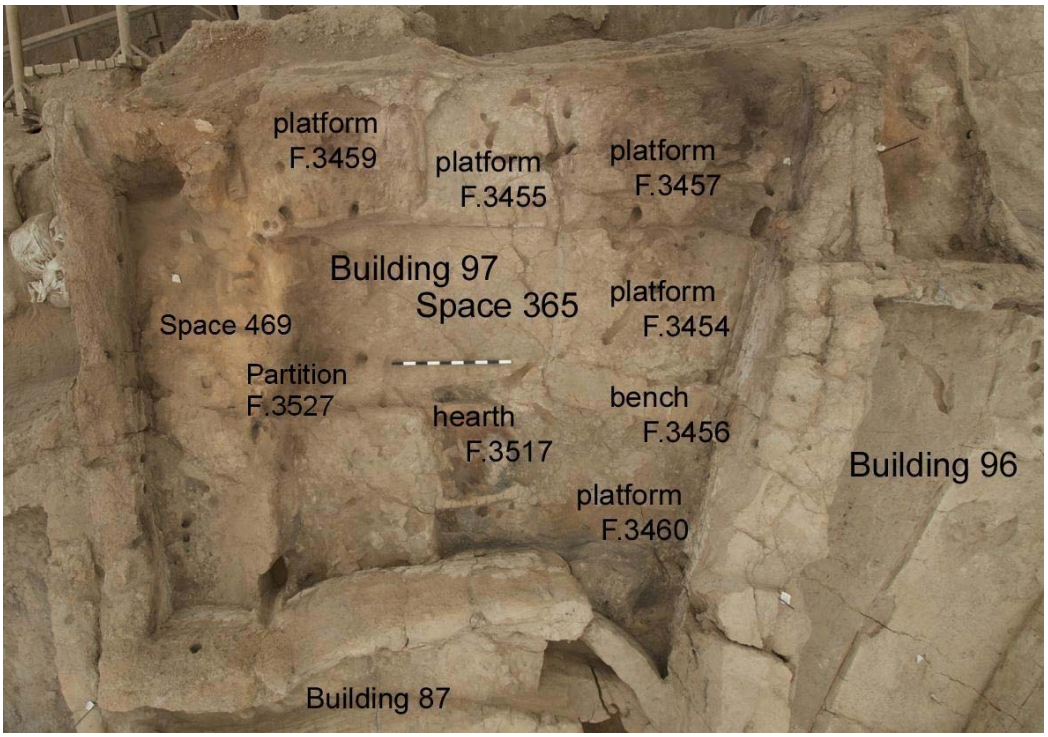

Figure 17. Latest phase of B.97. Photo Jason Quinlan. Figure prep. Shahina Farid.

Eastern platforms and bench (F.3457, F.3454 and F.3456)
The excavated sequence of the eastern platforms and bench consists of three main phases of remodelling of the platforms. Each of these events extended the width of the platforms so that they extended further into the central room and slightly realigned the bench with it encroaching into the southern part of the room.



(Left) Figure 18. Burial F3534, a juvenile lying on its left side in a crouched position. Photo Jason Quinlan.
(Right) Figure 19. Basket remains for neonate F.3542. Photo Lisa Yeomans

The lowest stratigraphic units excavated were from a burial F.3542 in the centre of the northeast platform. This feature was a neonate (19689) buried in a basket (19690) and covered with a basketry lid (19688) (see Figure H.Remains). The basketry appears to comprise of reeds or stems bunched together and tied together at the edges (Figure 19). The neonate was lying with its head to the west in a crouched position. The burial was sealed by a couple of layers ((19674) and (19666)) of make-up and a thin worn plaster surfaces on the platform F.3547. The edge of the platform was subsequently cut back (19673) and rebuilt (19671).

Subsequently a thick make-up and thin plaster layer (19660) was built around the edge of both platforms and the bench covering the surfaces and extending over the platforms further

to the south and changing the angle of the bench that slightly reduced the area to the south. This modification also raised the eastern edge of platform F.3457 where the platform abuts the eastern wall forming a curb in line with the slight dog-leg in the eastern wall at it's north end. Stratigraphically it was in this phase of modification that also witnessed the change in use from an oven to the use of a hearth requiring less space in the south part of the room. The plaster around the bench and on the lower part of the eastern wall was painted red during this phase of modification of the features along the eastern side of the room. The lower part of the eastern wall was not smooth but had slight grooves lower down and it was within a horizontal groove that the plaster was painted.

The next phase of modification of further make-up and plaster layers ((19636) on F.3457, (19637) on F.3434 and (19641) on the bench F.3456, altered the size and shape of the platforms further extending them into the middle of the room. Above this were plaster and make-up layers (19632) covering both platforms and further extending the platforms westwards into the central floor area. The back of the bench was also modified with the end of the bench next to the wall built up by (18685)/(18688)/(18689/(18693) just in front of where a thin timber between the bench and wall must have been positioned, indicated by timber shaped voids. The uppermost plasters and make-up layers ((18675) on F.3457 and (18633), (18644) and (18673) on F.3454) had suffered from erosion and only patchily covered the surfaces of the platforms.

Northern Platforms (F.3459 and F.3455)
The two northern platforms were only added towards the end of the occupation of the building and therefore underwent minimal modification prior to the abandonment of the building. The western of the two platforms F.3459 abuts the partition wall and the later modifications to the partition wall stratigraphically seal the construction of the platform. The eastern of the two platforms (F.3455) abuts the north-eastern platform but no later remodelling of the north-eastern platform took place after the construction of the platform F.3455.

The construction of the platforms was made with make-up layers used to infill the built edge (18663) above the central area floor make-up (18646). A plaster surface (18656) was laid over the make-up layer on platform F.3455. Above this plaster the central built raised division (18651/18652) between platforms F.3459 and F.3455 was constructed. The plaster surface (18649) on platform F.3459 lipped up against this division and was sealed by a further make-up deposit. The latest surviving surface (18637) covered the western of the two platforms (F.3459) and consisted of a plaster burnt by the fire that ended the occupation of B.97.

Southern activity area
The occupation sequence in the southeast part of the room extends under the overhang of the southern and eastern walls. These leaning walls would probably have collapsed if the occupation deposits in the southwest corner were excavated right up to the corner of the room so a limit of excavation had to be created below the leaning wall.

(left) Figure 20 oven F.3541. Photo Lisa Yeomans. (right) Figure 21. Bins F.3538. Photo Alison Mickel

The earliest exposed feature in the southern food preparation part of B.97 was oven F.3541. This remains insitu to be excavated next year. The oven was abutted by a series of dirty floor surfaces and occupation debris (19672), which had accumulated next to the oven (Figure 20). This layer spread throughout the southern side of B.97 and below bin F.3538 in the southwest corner of the building (Figure 21). Two clay balls and a worked stone were found together overlaying the truncated remains of an earlier bin. The floor layers and occupation debris was overlain by the rebuilding of the oven. This later oven F.3539 was almost identical in shape and size to the earlier oven measuring 1.05m x 0.9m and consisting of the truncated superstructure in a oval shape and burnt base (Figure 22). The ovens were both located where the southern wall of B.97 dog-legs to the south with a sharp overhanging corner. The latest oven contained some fill (19656) within the slightly raised area of the truncated superstructure. No fill was excavated from the earlier oven as the later oven had been built directly on the burnt base of the oven below.

Figure 22 later oven F.3539. Photos Lisa Yeomans,

A further series of dirty floor layers and occupation debris (19661) was excavated also abutting the outside of the oven F.3539. This layer had been burnt by two temporary hearth ((19655) and (19657)) in the area surrounding the oven (see Figure 22) and was sealed by further accumulation of occupation and trampled surfaces (19653) containing and a fine obsidian and flint tools next to one another in the southeast corner of the room (19653.X1 and 19653.X2). Two more temporary hearths ((19628) and (19626)) overlaying one another were excavated above this occupation built-up.

A southern platform F.3529 was built against the edges of a later phase of bins (F.3537). (Figure 23) The make-up layer (19649) for the platform was covered with a plaster surface (19645) that extended into the central area of the room. An additional small platform F.3535 was constructed to the south of the bench and abutting the eastern wall of the building. The make-up layer (19643) provided a raised area of 50mm in height and dimensions of 0.7m x 0.4m, which was plastered over with (19642). Also at this phase of the development of the building a bin was constructed across the southeast corner of the room. The edge (18665) of the bin formed a curved enclosed space right in the corner of the building and must have stood to relatively high height as on the eastern wall where it had survived truncated by the later ladder scar (19630) it stood to 0.22m. Following the disuse of the bin and the platform F.3535 a further series of trampled floors and occupation debris (19612) built up in the southeast corner of Sp.365. The southern platform was also raised and extended slightly to the east (19619/19622/19623). Truncating the top of the make-up layer was a small pit (19618) containing a couple of worked stones set on edge. The stones protruded through the overlaying plaster (19611/19615) and may have set so that they could be used insitu as a grinding/sharpening tool. A further plastered surface (19621) was laid under the overhang in the southeast corner, which was sealed by a temporary hearth (19620) and occupation build-up (19610). At this stage the southern platform was abutted by a built hearth (F.3530), with an edge (19609) around which a series of dirty floors and occupation debris (19607) accumulated. The fill of the hearth (19606) was sealed by another built hearth (F.3528) with an edge (19605). The two hearths were both square in shape with similar dimensions (just over 0.6m square) and built one over top of the

Figure 23. Lisa and Theo excavating platform surface. Photo Jason Quinlan.

other. A layer of occupation debris (19604) accumulated around hearth F.3528 probably from the rake-out of the hearth. This in turn was sealed by dirty surfaces and occupation debris (19602). The fill (19601) of hearth F.3528 was sealed by built edges (18699) of yet another hearth F.3525 which was built in the same location abutting the eastern edge of the southern platform; although it was slightly larger than the earlier hearths it still retained the square-shaped characteristic of the earlier hearths. Outside the hearth a rake-out deposit (18697) again accumulated and the hearth fill (18694) was sealed by a series of dirty floors (18680) moulded to form a hearth edge (F.3524). This moulded edge of the hearth was not in the same position as the earlier hearths and was located further towards the eastern wall. There was no distinct fill to this hearth and it was sealed by further layers of occupation debris and trampled surface (18679).

As the occupation sequence in the eastern end of the activity area built-up the southern platform (F.3529) was remodelling. A curb (also forming part of bin F.3521) was constructed over the top of the earlier platform surface. Within this curb (18686) a hearth (18682) was used once in the middle of the construction process before the core (18681) of the platform was added. The plastered surface (18643) of the platform was very eroded but a cluster of hackberry seeds was taken as separate sample (18643.S3).

In the southeast corner of Sp.365 a ladder scar (19674) truncated the floor (19679) indicating that the access into the building was though a gap in the roof over the area where the hearths and earlier ovens were located. The angle of the ladder scar shows that the ladder sloped up to the west with the foot of the ladder placed close to the eastern wall of B.97. Towards the top of the stratigraphic sequence there were a number of patchy remains of dirty floors and occupation debris which had badly suffered from erosion. For the uppermost hearth F.3517 in the occupation sequence location of the hearth had reverted back to the eastern edge of the southern platform built with a rectangular shape measuring 0.7 x 0.4m. The edge of this hearth (18642) and its fill (18638) were badly eroded having been originally been exposed in the 1960s.

Southwest storage bins

During the use of the building the storage bins were frequently knocked down infilled and rebuilt. In most cases the bins were confined to Sp.469 but in one phase they were built at the western edge of Sp.365. The earliest exposed bins (F.3543) comprised of at least three rectangular segments with the northern one lined with white plaster. The southern segments of the bin were very truncated and the layout unclear. These bins were exposed by the removal of dirty floor and occupation debris (19672) (Figure 24). Overlaying this occupation debris was another bin F.3538 located in the western part of Sp.365. This bin (19665) was not attached to the walls and appears to be free standing and comprising of two roughly oval segments separated by a straight division. Again the southern segment was lined with plaster. Only 50mm of the bin remained upstanding containing infill (19664) and (19663). The infill of this bin was sealed by dirty floors and occupation debris (19661) which extending though Sp.365 and Sp.469.

Figure 24. Storage bins in SW corner with debris (19672). Photo Lisa Yeomans

Above debris layer (19661) was another bin F.3537 that was added to over time. The built edges of this bin were heavily truncated but comprised of at least three rectangular segments infilled with (19651) and (19654). A further bin F.3526 comprising of two rectangular segments was constructed over infill of F.3537 with the southern of the two segments lined with white plaster. The infill of this bin (19631) was sealed by make-up layer (19625)

containing a fine obsidian scraper and a scapula. This make-up was stratigraphically sealed by a remodelling phase of the southern platform with the surface of the platform (19615) extending into the side room and forming a flat surface without any bins. However it was not long before the final set of bins (F.3521) were built over this surface. These bins were slightly larger with the eastern side attached to the partition wall between the two spaces of the building and the post that would have been against the south wall. The northern of the two segments of this bin was lined with a white plaster.

Partition wall

Throughout the excavated sequence of the building there was a partition wall F.3527 dividing the two rooms of the building. This was added to and changed extensively through the use of the building. The earliest excavated phase of the partition wall comprised of seven upright timbers encased in clay which had been preserved through the burning of the western room of the building (Figure 25). These timbers remain insitu with floor layers in Sp.365 and Sp.469 abutting them. At this stage the timbers formed a division from the edge of the bin area in the southwest corner to approximately 1.m south of the north wall providing access into the western storage room. The central four timbers were encased in thin (20mm) clay layer with gaps between each of the posts. Three of these four timbers were boxed elm with rectangular cross section measuring c.0.24m x c.0.12m. A further juniper timber with a round cross section was encased in clay to the north of these and additional juniper timbers were located to the north and south. This created a partition wall with vertical gaps onto which the bins were built. A number of layers of floor in the main room abutted with construction before mudbricks (19639) were added to the north end of the partition. These mud-bricks were 0.38m in height but they must have been a threshold or had a crawl-hole built into it at a higher level otherwise access into Sp.469 would not have been possible. Above central floors (19600) a narrow row of mudbricks (19698) were added to the eastern side of the partition wall strengthening and covering the gaps between the posts at the base. Inside the western storage space the floors layers accumulated at a slower rate and these floors below (19698) were (19650) and where the floors were more burnt by their location next to a timber they were excavated as (19659) although they should be considered part of the same floor layers.

Figure 25. Timber posts in partition F.3527. Photo Lisa Yeomans.

The height of the mudbrick addition to the partition wall was increased with an additional course of bricks (18657) after the central floor had been raised with make-up layer (18646). The final remodelling (18650) of the partition wall was a badly eroded repair to the north end of the wall.

Infilling

Although the 1960s backfill was excavated last year several unexcavated original infilling deposits remained unexcavated. In the southeast corner of the building a triangle of infill was unexcavated where the wall dog-legged to the south. This infill (19245) appears to have accumulated in a retrieval cut in the southeast corner but it is difficult to be certain as only a small section of the original stratigraphy was left in the 1960s. This infill (19245) contained a large amount of animal bone mixed with the articulating bones of a juvenile human left leg. Other human bone was found in the infill and there may have been the deliberate discard of

human bones into the infill of this building. This is supported by the infill (18645) of bin, which contained a human femur fragment lying on the base of the bin and part of a human skull fragment overlying a antler fragment in the northern side of the bin infill. To the north of the bin the building infill (18641) was excavated containing a large amount of animal bone as well as a couple of figurines underlying fill (19243) which also contained a lot of animal bone and a bead. The material excavated from these few insitu infill deposits are more typical of midden and it may be that after the building went out of use it was used as a midden area. This fits with evidence that after the abandonment of several burnt houses the area became an external space for a significant period of time. The infill may have included material cleared out after the fire as a significant amount of the animal bone found in these deposits was burnt.

Conclusion
B.97 comprises of a complicated stratigraphic sequence that shows that the building was modified repeatedly over the course of its use. Despite these modifications the overall layout and use of space the building remained constant. The most impressive finds of the 2011 season are the burnt remains of the partition wall providing a detailed picture of the construction of partition walls and the neonate buried in basketry in the northeast platform.

Spaces Sp.369, Sp.459, Sp.474, Sp.471, Sp.472, Sp.473 & B.100 – Roddy Regan

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Introduction
This year's excavation area encompassed Space 369, which was identified and partially excavated last year while incorporating areas to the west and north. Within Space 369 this mainly involved the continued removal of a yard/midden sequence, this becoming Space 459. To the west and north excavation primarily constituted of removal of a large backfill deposit from the 1960s excavations and removal of a sequence of very truncated buildings and associated deposits (see Figure 16).

Earliest Buildings
The earliest features reached lay below a series of midden or open area deposits, their removal revealing several walls that likely define contemporaneous buildings and/or associated yards/spaces (Figure 26).

Figure 26. Location of different structures exposed at end of season. Looking W. Photo Jason Quinlan

At the south east of the excavation area, three walls defined the north end of a structure, Building 104, Space 474, defined by walls F.3702, F.3703 and F.3704 respectively the north, west and east walls. A thick deposit of multilayered wall plaster adhered to the inner wall faces suggesting this building was relatively long lived. Internally extant midden/dump/demolition deposits are still to be excavated.

To the north of this building lie the very truncated remains of the southern end of another structure F.4099, which can perhaps be associated with the southern annex of the 1960s Shrine 8 at Level VI/VII. Most of the internal features and fills of this structure had been removed in the 1960s although remnants of plaster floors (19368) survived at what would have been the north east and south west corners of this room.

To the west of Building 104 lay a series of abutting walls F. 3705, F.3706 and F. 3707 no doubt define other buildings or enclosed spaces, presently labelled Space 471, Space 472 and 473.

Open and Midden Area

Building 104 and the spaces to the west appear to have been backfilled by a mixture of roomfill and midden with no evidence of 'new' structures being constructed directly over/on earlier walls. The deposits that sealed Building 104 and the walls to the west suggest the whole area was utilised as an open area post-abandonment (Figure 27). As mentioned above the area to the west of Building 104 had previously been truncated by the 1960s excavations, which effectively created a 'ledge' of in situ archaeology that ran between the 1960s truncation and the present southern and western limit of excavation. This formed Space 475 and the excavated in-situ deposits were (19384), (19383), (19382), (19377), (19373), (19369) and (19366). These deposits suggested this space continued in use as an open area with an accumulation of midden or 'yard-like' deposits with one fire-pit ((19376)/(19378)) amongst the sequence

Figure 27. Midden in Space 274.

The sequence of deposits lying within and above Building 104 was less truncated and thus easier to order. As mentioned above the building appears to have been partially backfilled by a series of roomfill and midden deposits (Figure 28). At this point retaining walls, F.4096, and F.4085/F.1316 are respectively constructed over the W and E walls of Building 104. The reason for the construction of these walls is as yet unclear, although they appeared to delineate an area of midden dumping Space 459, as opposed to more 'yard-like' deposits at the west and it may be that their purpose lies in midden containment, or separation. It is also possible that when these retaining walls were constructed the north wall of the now abandoned Building 104 stood higher than the east and west walls hence the need for their construction, if the area was intended to be given over to midden. The solidly built revetment at the east, F.4085, Space 460, certainly separated the midden area from Buildings 87 and

B.97, a separation that was maintained by additions to the wall as the midden increased in height. The reasons for the wall delineation at the west are less clear although the walls here (as at the east) may have had a dual function of building support and midden separation. At some point the north wall of Building 104 is pushed over or collapses (19353) (Figure 29) and this is in turn sealed by a lengthy series of midden or yard-like deposits (19349), (19348), (19347), (19345/19346), (19342/19343), (19341), (19340), (19339), (19338), (19337), and (19336).

Figure 28.Roddy in his element digging room fill and midden within collapse shell of B.104. Photo Jason Quinlan

Figure 29. Collapsed wall (19353).Photo Jason Quinlan.

Because of the proximity of the midden deposits within Space 369 to structures B.87 and B.97, and the fact the demarcation between the midden and buildings were maintained suggests the midden partially derived from these sources. (One note on the midden sequence was the recovery of a relatively large number of figurines and figurine fragments. These appeared to be concentrated on the upper edges of the midden deposits, on the north side. It is not beyond the realms of imagination to see children playing with ultimately loosing these objects in this open area. Also recovered from the same deposits and place were numerous mini clay balls and its possible these are also associated.)

Later Buildings
Occupying the south west corner of the excavation area (and the shelter) is a large structure, that was partially excavated in the 1960s, this now labelled Building 100, Space 383. The foundation trench for the east wall of this structure F.4009 (fill (19374, cut (19375)), cut through the truncated dumping/yard sequence previously described above at the west of the excavation area (previously listed above). This evidence again suggests a period of open area use between building phases in this part of the site. Also lying above these truncated open area deposits were the remains of two structures solely represented by the foundation courses of their south west and north east sides, respectively F.4094 and F3513. These structures were also later than the midden sequence sealing Building 104. It is possible these buildings were contemporaneous with the use of Building 100, but lack of physical stratagraphic links makes this speculation. Similarly a wall possibly representing a later version of the 1960s Shrine 8 might also belong to this phase of occupation, although again truncation makes this relationship unsure. The area between these structures and Buildings B.87 and B.97, Space 369 continues as an open area although the deposits within this space appear to become less 'midden-like' and more 'yard-like'.

Note on previous excavations
Much of the western and northern part of the excavated area had been previously excavated in the 1960s. The levels then reached obviously contained little of interest and the exposed area was left unexcavated with much of it's subsequently backfilled. Removal of this backfill revealed a distinct slope at the north east of the excavation area and it is likely this was a cut made by the previous team as an access ramp, possibly into the excavation area to the north. Despite the quantity of soil that had to be re-excavated the backfill material included some objects of interest, including remnants of cigarette packets and a wine cork. Throughout the soil especially along the southern edge of his original cut were numerous fragments of human bone. Initial analysis of these remains suggested the minimum number of individuals present was just two, although closer study of the bones might push that number up (Lori Hager pers comm.). The remains of an adult male suggested the presence an unusually robust individual, if compared to general Neolithic population present at Çatalhöyük and it may be that this individual belonged to a later period. A group of stones, including a complete grindstone, were also present along the western edge of the backfilled area, suggesting perhaps a sorting and discarding of the excavated finds in the 1960s.

Building 89 – Space 379 2011 Season - James Taylor

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Introduction
This season saw excavation continue in Building 89, which was begun by Michael House in the 2009 season. Sealed by Building 76 above, B.89 appeared to broadly have the same planned extent, consisting of one space, Space 379 (see Figure 16). This once again suggests continuity between the underlying structure and its replacement.

Perhaps what was most notable about the excavation in B.89 this season was the coordination with a team from UC Merced, led by Maurizio Forte, who implementing and

evaluating a variety of techniques in digital recording. UC Merced's digital recording strategy (see 3D Digging Project below) was designed to complement the existing recording system. It is worth noting that on site this was very effective and that although digital elements of the recording did take slightly longer to implement than normal, the delay was not significant enough to cause any major problems. Written recording could for example be carried out during the scanning process – or staggered breaks could be used to allow the scanning team to finish their work. In all a considerable amount of excavation was undertaken this season, with little or no disruption from the digital methodologies employed.

A summary of the stratigraphic sequence excavated this season.
Sp.379: Earliest Archaeology (end of Season 2011. Refer to Post-Ex Plan 2011 –11/130)

Exposed Walls and Wall Plaster
B.89 has turned out to be a large slightly off-square building, with internal dimensions approximately 5.6m north-south by 5.3m east-west (Figure 30). At the end of season 2011, 1m wide sections remain in situ through much of the sequence of room fill on the south and west sides of Sp.379, obscuring most of the wall faces and architecture on these sides. Where plaster can be seen it is up to 100mm thick (in the corners), averaging 40-50mm thick in the centre of the wall faces.

Figure 30. Pre excavation of infill in B.89. Photo Jason Quinlan

The plaster on the southern side of the room (exposed up to 0.5m where the section is lower, beginning at the top of (18793) – see text below), has revealed some moulded features on the southern wall (Figure 31) including a possible decorated pillar and a possible niche, although it is too early to say what these might be. The southeastern corner, may have evidence of a ladder scar and is apparently burnt or scorched to the point where the plaster is blackened and the upper surfaces are beginning to flake and laminate.

Figure 31. Detail of plaster on south wall. Photo Merced Team.

The western wall face is almost completely obscured by the section, which stands approximately 1.0m high (to the top of Unit (18780) – see text below), except for one 1.0m wide sondage back to the wall about half way along (the remains of the original northwest quadrant) reveals plaster on the wall and the top of a possible moulded pillar with a 'fluted capital' (it seems likely that this is not strictly a capital since the pillar may be too close to the floor surfaces to be at its top – instead it may be the remnants of a decorative moulding – Figure 32).

Elsewhere on the eastern wall exposed to a height of approximately 1.0m, two post-retrieval scars were very clear approximately 2.0m apart aligned broadly 1.30-1.40m from the northern and southern walls respectively. These were approximately 0.5m wide and cut back to the original brickwork of the building. In the central panel of the east wall there are two scars (one to the immediate south of the northern post-retrieval scar, the other to the immediate north of the southern scar). These are sub-circular, or sub-ovoid irregular cuts in the plaster which cut back to the brick in places but show clear early laminations of plaster (behind whatever was removed) and would appear to suggest (or hint at, albeit speculatively) the removal of moulding or artwork prior to abandonment. These 'retrieval scars' appear to physically tie into and be related to 'wavy moulded lines' in the plaster face which appears to be decorative. These were noted on the north wall as well.

Figure 32. Post emplacement or moulding on W. wall. Photo Jason Quinlan

Similarly, plaster was only present on the northern wall in the northeast corner (for a span of about 1.3m). The centre of the north wall appears to have been scoured back to the bare bricks and mortar. Some room fill remains in situ obscuring where this might happen and whether there is more going on here than initially thought - Mellaart hints at the possibility that there might be a crawl-hole or door from the burnt building he largely excavated immediately above B.89 (B.76) the structure to the immediate north. It is possible that the scouring of the north wall of B.89 may be an earlier incarnation of this, or alternatively that it may reflect the removal of artwork or mouldings from this wall on abandonment. At the time of writing and at this stage of excavation this remains speculative.

Low down on the eastern and northern walls one of the 'wavy moulded lines' appeared to be more distinct than the others and may have served as a convex moulded rail (approximately 0.7m down from the top of the surviving plaster face). In the northern panel of the east wall this moulded rail, was built to include a small plastered niche approximately 150mm wide by 100mm high. This is very similar to the niche found in the east wall of B.80 (Taylor, Archive

Report 2009; Regan, Archive Report 2010). Also in common with B.80 was the presence nearby of a small round plastered hole c.60mm diameter in the same panel.

Figure 33.. End of season looking S. with plastered walls, scars and mouldings. Photo Jason Quinlan.

Although throughout Sp. 378 the plaster is bright white as is common at Çatalhöyük, below the convex moulded rail in the lowest register on the northern panel of the eastern wall and where plaster survives on the north wall, there is evidence of underlying red paint where the plaster did not survive completely – although there is no indication as yet as to whether this forms any pattern or complex artwork.

Floors and Underlying Architecture

At the end of the 2011 season, some aspects of the underlying floors and architecture were visible and present within the area (Figure 33). Specifically the top surface of the roughly square northeastern platform was clear (measuring approximately 1.3m east-west by 1.25m north-south). The platform surface was bright white plaster and showed clear signs of a large central depression, hinting at possible burials below. The southern edge of the platform was damaged in antiquity, possible scoured at the time of abandonment (hinting that this may characterise the abandonment sequence of the whole structure), revealing at least two floor and make-up events in section.

The surface of the platform was sealed by a primary plaster collapse (not yet excavated and therefore not yet numbered), which was also associated with spots of red paint. The western side of the platform was obscured by some of this collapse, beneath which there appeared to be evidence of a scoured out linear structural element ('bench?') which may define the platform's eastern limit (it is interesting to note that this broadly corresponds to the point at which the plaster is stripped back on the north wall (see above). A small informal exploratory sondage appeared to indicate that this 'bench' may continue at a lower level physically towards the centre of the room (refer to Post-Ex plan 11/130), although the limits of any such structure are not yet clear due to the presence of unexcavated room fill (see below).

The only other evidence of underlying architecture or features at the end of the 2011 season was in the southwestern corner of Sp.379. Here a sub-circular change in the room fill would appear to suggest the presence of a post-retrieval pit. This is clearly associated with a north-south oriented linear feature, which may be a partition wall or bench (plaster lines were evident on three sides and the structure itself is a bright orange sandy-silt resembling make up material of internal furniture seen elsewhere on site). At present the feature appears to be 0.25m wide and the length is unclear (not yet excavated and therefore not yet numbered). It is worth noting that it broadly corresponds to an internal division recorded in the overlying B.76,

Sp.137, which was marked by a burnt wooden post (see (18421) and (18426); House, Archive Report, 2009. As well as (18787), (18788) & (18786) this report below). The possible post-retrieval pit (again not yet excavated and therefore not yet numbered), also appeared to have truncated floors and floor make-up, at least two of which were visible in section on the south side where the fill was removed slightly.

All of these underlying architectural features, remain ambiguous as the decision was made to stop excavating above the primary abandonment deposits, which remain in situ (also not yet excavated and therefore not yet numbered). This was partly to protect the floors for the upcoming off-season, but more importantly to coincide with the departure of the U.C. Merced team, enabling the digital recording to continue in sync with the conventional analogue recording employed as standard procedure on the Çatalhöyük project. It remains unclear exactly how high the northeast platform is, or how much material needs to be removed before the central floors will be revealed.

Sp.379 Excavated Abandonment Sequence

The earliest abandonment deposit excavated this year was (19808), which appeared to seal the whole room (Sp.379). It is worth noting at this point that the presence of the sections through the abandonment sequence to the west and south means that all of the deposits mentioned in this narrative are not fully excavated and it is impossible to speculate on their behaviour on these edges of the building. Room fill (19808) was homogenous, but coarse (compared with much of the upper part of the sequence) consisting of compacted fragments of brick and plaster (10-15mm) with frequent charcoal lumps.

The upper surface of this deposit marked an interface at which a large piece of collapsed moulded plaster (19807) was found (1.1m long by 0.7m wide). It appeared to be a composite architectural feature, badly damaged on the south & west sides. It was constructed from a pise-like and plaster rich core, apparently surrounded by mid grey brown brick-like material, finally coated with a thick plaster (30-40mm thick), which resembled that on the walls of the room.

The uniformity of the plaster core suggests or hints at it being part of a sculptural piece, perhaps reworked at a later date, perhaps just the top right quarter. Upon excavation the underside showed evidence of doweling or a wooden frame structure (semi-cylindrical impressions lined with charcoal), possibly used for suspension on the wall. This combined with the shape of the plaster core may indicate that this was a damaged or defaced bucrania or moulding. It was not clear where it came from (in the building), and it's subsequent deconstruction revealed nothing special about the core.

Another dense layer of grey brown room fill, (18793), sealed this moulding. It was essentially composed of the same constituent materials as the rest of the room sequence (brick, plaster and charcoal) but was much more homogenised and finely mottled. Sealing this was another heavy layer of more course room fill, (18790/18791). This was notable because it contained lenses of bigger plaster fragments and brick, especially lower down towards the basal interface (sorted by gravity perhaps when initially thrown into the room).

The interface between this lower part of the sequence and the final room fill deposit (see (18780) below), was marked by a thin band of plaster collapse against the east wall, (18795), suggesting that perhaps the top of the plaster in Sp.379 was left exposed and had time to deteriorate before the abandonment sequence was finished off.

The last room fill in the abandonment sequence (18780/18781/18784/18785) might debatably be seen more accurately as a construction, or preparation deposit for the foundation of the overlying B.76. It finally sealed the plaster surfaces on all four walls and may have been deposited after the construction of the walls of B.76 (in order to act as a foundation and makeup for the floors of this upper building), although this relationship would need to be investigated more closely next season when the walls of B.76 are finally removed and the construction interface between the upper and lower buildings are finally revealed.

Nevertheless the upper surface of this room fill deposit, (18780 et al.), acted as a construction horizon for B.76, Sp.368 (see below), in the northwest corner of the space. Room fill (18780 et al.) was essentially another heavy compact, lensed deposit, which was very similar to the rest of the sequence. Notably the top 100mm was characterised by dense clay rich brick like material, concentrated in the northwest corner of Sp.379, again perhaps preparation for the construction of the later Sp.368.

These deposits were all very large and notably sterile, ranging between 2,000-10,000 litres, the hand sorted finds were very sparse a few medium-sized bags of bone across the whole deposit. The retrieval from the sieve was even more sterile (occasional obsidian flake and small bone fragments) suggesting that hand retrieval of finds was picking up the bulk of the material culture here. Almost no X-finds were retrieved (only a couple of bone points).

A strategic decision was taken prior to excavation to quadrant the abandonment sequence (see introduction above) to see if any interpretative subtlety could be teased out of the sections (Figure 34) In fact it is fair to say that the sections broadly reflected the sequence as it was understood in plan: room fills appeared to be dumped, manipulated and compacted in order to bed down a construction horizon or foundation for the overlying building. It was clear to us that no stratigraphic information was being lost by excavating in plan.

Nevertheless it is fair to say that sections through the room fill clearly showed tip and dump lines, which fell towards the centre of the room, suggesting material was dumped from the side (perhaps standing above the demolished walls. The presence of heavier ‘tumble’ towards the bottom (especially around the edge of the room) suggesting that walls may have been demolished into the room and this material processed in situ. This would also explain the tendency to dip into the middle and why the coarse layers are generally interspersed with finer more homogenised deposits (dragged around and processed to fill depressions in the room). The sections also revealed that the lenses within some of the room fills were naturally sorted (heavier material near the basal interface) also supporting the notion that the material was being dumped (or collapsed) from the edges of the building.

Figure 34. James making sense of excavation of infill in quadrants. Photo Jason Quinlan

The final feature in the abandonment sequence of the structure was a pit of unclear function, (18783), filled by unit (18792), approximately 1.2m across by 0.39m deep and located in the southwestern corner of the space.

B.76 Construction Phase / Interface
Sp.137
If room fill (18780 et al.) marked the interface between the abandonment of B.89 and the construction of B.76, then everything above this would appear to belong to B.76. For most of the area this meant that the overlying deposit was room fill (18778), excavated in 2009 (House, Archive Report 2009). Although the remnants of a post-hole were found in the south western part of the structure (18787), which was essentially the bottom of post-hole (18426) also excavated in 2009. The pointed end of a charred post was found in situ at the base of this cut, (18788) before being filled by unit (18786/18421).

Sp.368
Room fill (18780 et al.) also acted as the foundation horizon for the construction of Sp.368 (see discussion above). All of the following units rightfully belong to this space (and B.76) despite initially being thought to be part of the underlying B.89. The construction sequence was first marked by the laying of a make-up or levelling deposit, (18798), which was essentially a thick layer of white unfaced plaster-like material. Upon this rested the wall (18796/18797), which clearly abutted the walls of B.76. This L-shaped wall demarcated a space (Sp.368) c.1.3m east-west by c.1.6m north-south, which had an unclear function as part of B.76. Although the walls survived almost 0.4m high there was no clear surfaces inside, just two compact and mixed plaster and brick rich fills (18792) and (18789), split by a thin band of mudbrick collapse (apparently associated with the northern wall, at the northern end of the space (18794).

Other Work in B.79 and B.80
Some work was carried out in B.80 this year; this was twofold. Firstly, excavation was begun (but not finished) upon the western walls of the structure, in order to make them safe for working in B.89 below and to the west. This work was incomplete although unit numbers were allocated to the walls of B.80 and B.76 as well as the internal plaster in B.80 and the between wall fills of both structures. All of these units remain open (for completion in future seasons and will not be discussed here in further detail, as they are not yet tied down stratigraphically.
Remaining work in these structures was largely coordinated by the conservation team in order to reveal and preserve paintings which had become evident in these structure since there closure after excavation in 2010 (see below).

Further Work: 2012 and Beyond.
Next season, work should continue with the stratigraphic excavation of the remaining room fill deposits and underlying structural remains. However because of the collaboration, with the team from UC Merced, experimentation in the generation of a complementary 3D digital archive during the excavation process can also continue.

Work thus far has proved fruitful and clearly demonstrates that there is a place for applied digital recording techniques relating to complex archaeological sequences. But it does reflect the method of excavation rather than the deposition process, the scanned data will record the deposit as the excavator has defined it and therefore is only ever as good as the excavators decisions. It is fair to say that at this stage these technologies cannot replace the standard recording methodologies on site, since their implementation remains at an evaluation stage. However there is scope for considering how these technologies might continue to augment the standard archive.

From the perspective of an excavator operating within the standard recording methodology for the site, this might include continued refining and development of the 3D digital workflow to make the process of data capture even more efficient. Perhaps more importantly continued collaborative dialogue and feedback on what these technologies bring to the excavation and recording process is also necessary.

Building 80 – Shahina Farid

Supervisor James Tayor*
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Conservators Ashley Morgan Lingle (3), Flavia Ravaioli (3), Jill Saunders (3), Sanaz Mehran (4)

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During the course of the season some work was carried out in B.80 to the west of B.89. The work was twofold; firstly excavation was begun (but not finished) on the western wall (F.5036) of the structure, in order to make the area to the west in B.89 safe for work. This involved excavating the abutting west wall of B.80 and the east wall of B.76, which overlay B.89. The second area of work focused on the wall painting that was exposed on the east wall F.5014 and some areas that were exposed on the south wall F.5037.

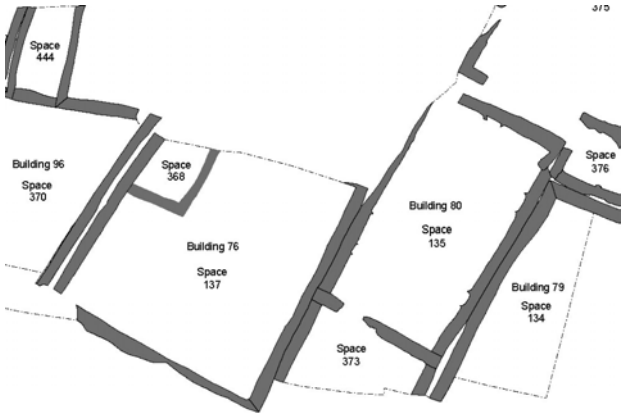


Figure 35 Abutting walls of B.80 and B.76. Plan David Mackie.

West wall

Excavation of the west wall F.5036 was undertaken to reduce the height that stood dangerously high over excavations of the neighbouring, but earlier Building 89 (below B.76). This required excavations of the abutting walls of B.80 and B.76 (Figure 35). The walls were excavated in section in order to ascertain if possible, an order of construction in the form of any cuts that may have occurred at construction phase or, by the deposition of the between wall fills. Excavation thus progressed from the north southwards in sectioned segments that were excavated and drawn at intervals. The exercise was incomplete by the end of the season, which must be finished in 2012. So far, no light was shed on the order of construction other than the abutting relationship of the two buildings.

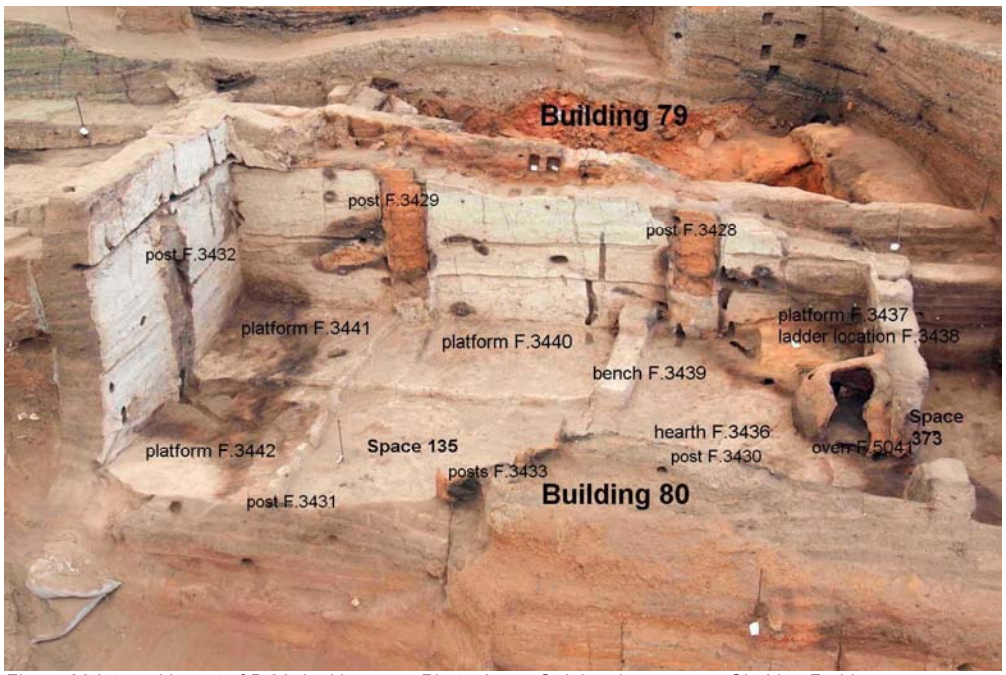


Figure 36 Internal layout of B.80, looking east. Photo Jason Quinlan, image prep. Shahina Farid..

Brick (18799) and mortar (19801) were allocated to the west wall F.5036 of B.80 with between wall infill (19802) between it and the east wall F.3401 of B.76 for which brick (19810) and mortar (19809) were allocated.

Wall plaster (19803) was excavated from over the central double post emplacement F.3430 on the west wall whilst (19806) was the plaster that rendered across the entire wall. As the wall plaster had been consolidated in the previous season due to its fragile nature and extensive charring, the plaster was difficult to remove layer by layer. However there were approximately 30 layers of plaster applied to this west wall. The plaster was more stable and less damaged towards the base, but very damaged towards the top. Four spots of bright red paint were found stretching across the centre of the wall plaster.

Threshold between Sp.135 & Sp.373
The threshold between the two rooms of B.80, the larger Sp.135 to the north and smaller Sp.373 to the south was recorded as (19804). This was in the form of a burnt wooden threshold recorded as less than 100mm thick, and probably represents the remnants of a single wooden plank that burnt in situ. Investigations took place at this location before damage was done to the fragile deposit. The plank was overlain by the floor sequences in Spaces 135 and Sp.373, which remain unexcavated at time of recording.

East wall
During a routine monitoring of exposed wall plaster on the east wall F.5014 speckles of red pigment were noted and duly investigated (18918). As the expanse of red paint grew it became apparent that a complex design covered the whole of the lower panel of the east wall. The wall is divided into three horizontal panels, the lower is defined by a shallow step-in c. 0.5 m from the floor, a further panel c. 0.4 m in height is defined by a horizontal groove (almost like an inverted rail or dado) and a slightly larger height of panel (surviving in the NE corner and along the north wall only) is defined by a beamslot (Figure 36). The majority of the painting exposed in 2011 was defined between the two post emplacements on the east wall and extended over the top of the bench (F.3439).

Figure 37. Vertical panels of a repeated abstract motif followed along the edge of the north post emplacement and red border around the small 'hand' niche in the central panel. Photo Jason Quinlan.

Overall the design appeared to be arranged in vertical panels of a repeated abstract motif that has been likened to bricks (Figure 37). A similar painting was found in the 1960s (Figure 38) that Mellaart called a 'kilim' design and the closest resemblance from current excavations is a photograph of collapsed mudbrick walls in the 4040 Area (Figure 39).

Curiously, the design was traced on the underside ledge of the step-in (see Figure 138), an area that would not be visible in a standing position but would be visible if squatting or lying on the platforms? As the painting was found on this ledge it is likely that the painting will extend onto the central panel also but little investigation was carried out in here in 2011 and

thus far painting has only been traced as a red border around the small hand niche (see Figure 37).

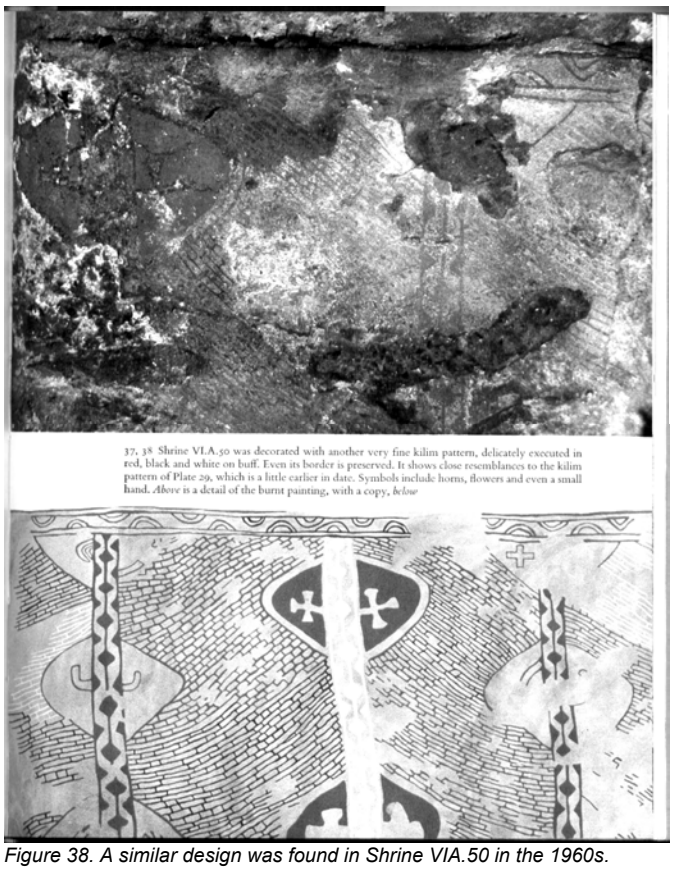


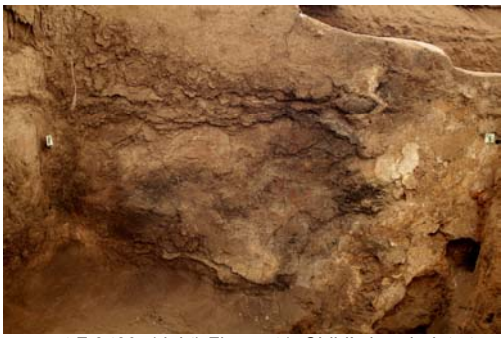
Figure 38. A similar design was found in Shrine VIA.50 in the 1960s. Above as found with a reproduction below. Images James Mellaart 1967

Upon tracing the extent of the painting to the north, it followed the curvature of the post emplacement (see Figure 37) and extended across the front plastered face, but here the design was more of a spiral motif (Figure 40), almost floral, which is not a familiar Çatal design and quite a contrast to the central panel. To the south the wall plaster was badly fire damaged but traces of paint could be seen over the southern post emplacement however the motif could not be deciphered. Here, paint was also traced over the south wall face around the oven (18920). Again, badly fire affected but where child handprints were found (Figure 41).

Figure 39. Collapsed mudbrick wall exposed at the surface of the mound in 2003 4040 Area. Photo Jason Quinlan

As noted above (see Introduction), there appears to be several phases of painting, which repeats the same pattern over time. The plaster was mechanically revealed using scalpels which was very time consuming. The project took 9 days to complete, with up to 6 people at a time working along the wall face (see Figure 2). As directed by Shahina Farid, a count of removed plaster layers that exposed the design were noted at different areas across the wall surface. In the main these varied between 10 – 20 layers although in some areas faint traces of red were revealed 5 layers in but the main design was exposed behind between 15 – 20 layers in. The child's handprints on the south wall were behind some 30 layers of plaster.

As much more work needs to be done, which could not be concluded within the timeframe of this season the painting was covered with Japanese tissue and geotextile and supported with soil filled sacks.

(left) Figure 40. Motif across the front of the N post emplacement F.3429. (right) Figure 41. Child's handprints to the east of the oven F.5041, near the ladder emaplcement. Photos Jason Quinlan.

References
Mellaart, J. (1967) Çatal Hüyük: A Neolithic Town in Anatolia. Thames and Hudson: London.

Building 79 – Shahina Farid

Supervisor James Tayor*
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In the neighbouring building B.79 to the east (see Figure 35), a similar routine monitoring exercise of exposed wall plaster revealed areas of red paint on the west (F.5013) and north (F.5012) walls. The building was heavily fire damaged (see Building 79 Archive Report 2009), such that the walls and plaster were in places heavily vitrified and in other areas severely delaminated with spalling plaster laminations. These conditions made the process of revealing the painting very difficult.

Figure 42. West wall F.5013 of B.79. Red painted 'inverted rail', between the two post emplacements, with traces of undecipherable markings on the lower panel and a series of 'stripes' over the upright plaster encasing of the central post emplacement. Photo Jason Quinlan.

Positioned between the post-emplacements on the west wall were horizontal grooves (or inverted rails) and another along the north wall. These grooves were painted red (Figure 42),

below some 2 - 4 layers of plaster render (plaster (18599) & (18900) on the north wall and (18570) & (18571) on the west wall). In addition an area of the lower panel, below the 'inverted rail' was also painted in a series of abstract lines that looked like random lines, squiggles and doodles. These were traced below c. 26 layers of plaster. However it was not clear whether the lines were finished or partially fragmented from a larger motif. The upright plaster around the central post was also painted in a series of stripes.

4040 Area

Other than on-going remedial conservation work (see Conservation Report) only one building, B.77 was under excavation in the 4040 Area in 2011.

Building 77 - Daniel Eddisford

Supervisor: Daniel Eddisford*
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Previous excavations

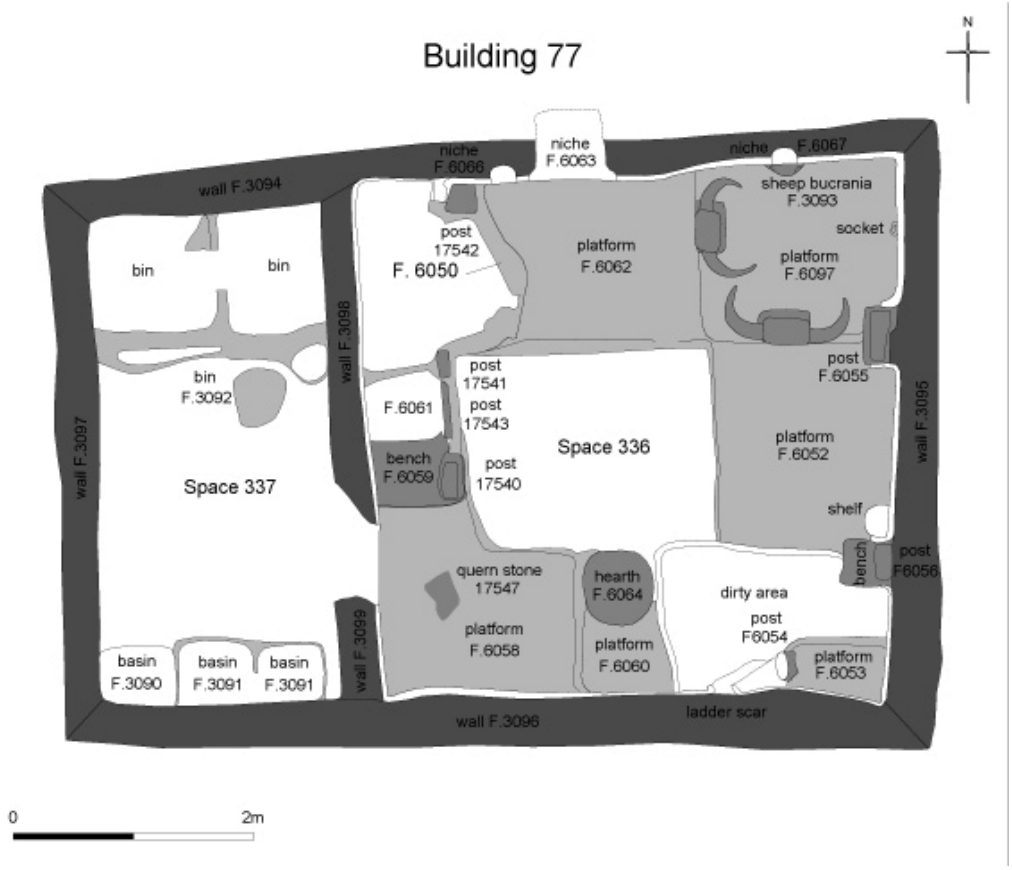

Figure 43 Final phase plan of Building 77. Plan David Mackie.

The excavation of Building 77 began in 2008, with the removal of the burnt room fill associated with a fire that destroyed the building. The building consists of two spaces, a smaller storage area to the west, Space 337, and a larger room to the east, Space 336. The features within the building conform to the site wide pattern; the oven and food preparation

activities occur in the south and burials along with painted plasters and more elaborate decoration are focused to the north and generally to the east side of the building (Figure 43).

A ladder scar on the southern wall of Space 336 would have given access to the building; a hole in the roof in the southwest corner would also have allowed smoke from the fire installations to escape from the building. Two engaged plastered pillars on the eastern wall were decorated intermittently throughout the building's life. The northeast platform, F.6051, had two low pedestals with protruding cattle horn cores, creating a horned enclosure around the platform. On the northern wall was a small plastered calf's head, and directly below this a small niche. In the centre of the northern wall were a large alcove and a second niche mirroring the niche on the western side of the alcove. To the west three large timbers were associated with a fourth post against the northern wall (Figure 44 & see Figure 45), and divided off the western area of the space. Access to the small side room Space 337 would have presumably been through a access hole to the south of the central post.

Figure 44. Carbonised timber posts create division to the NW area of the room. Photo Daniel Eddisford

The last floors of Space 336 were covered with a range of artefacts, associated with the abandonment of the building. These included a large quantity of burnt animal bone, large clusters of ground stone, and worked bone objects. It seems likely that many of these objects had possibly hung from the rafters of the roof, or fell in from the roof or from a second story (see 2008 Archive Report). Two large bins in Space 337 appear to have been cleaned out and deliberately backfilled prior to the fire. To the south of the smaller side room three basins contained further ground stone artefacts, articulated eagle sized bird talons and two obsidian projectile points.

Building 77 was excavated to its abandonment phase during the 2008 field season; excavation was halted at this point so the house could be left on display for visitors. However, after two years the building had deteriorated significantly, and there was a risk that information about the house would be lost. Therefore it was decided to fully excavate the building in order to preserve the structure by record before further information was lost. Excavation was started in 2010, focusing on the northeast platform, the north and eastern walls and the southern platform and oven in Space 336. In addition Space 337 was completely excavated in the 2010 season (see 2010 Archive report).

The 2011 excavations

Excavation of Building 77 was continued during the 2011 season. A number of floor deposits were removed, wall plaster was excavated to reveal a series of painted decorations, and a sequence of disarticulated burials was removed from the northeast platform (Figure 45). The building was not fully excavated; the early floors remain, along with a large blocked in oven, layers of painted plaster on the northern wall and a number of unexcavated burials below the northeastern platform.

Figure 45. Main elements under excavation 2011 season. Photo Jason Quinlan.

The north wall

The northern wall, F.3094, was repeatedly plastered throughout the buildings life, with up to 50mm of plaster accumulating on the walls of the building. The earliest episode of plastering exposed, (19559), was decorated with 12 red handprints (see Figure 5). The handprints are all of a similar size and are all right-handed. They start at a small niche F.6066, at the west side of the wall and form a line across the wall. The red handprints appear to have been made by a single individual who applied red pigment to the right hand and then pressed it on to the wall. The two handprints at the eastern end of the wall were removed from the wall and conserved for future display.

Figure 46. Calf's skull installation F.3093, a later addition above painted niche F.6067. Photo Jason Quinlan

At the eastern extent of the north wall the painted hand decoration was sealed by partially excavated layers of white plaster; this deposit was not removed from the lower part of the wall. The last layer of plaster in this sequence was painted red around niche F.6067. Further layers of white plaster were applied to the northern wall. At this point an installation consisting of a plastered calf's skull, F.3093, was attached to the north wall with a wooden peg (Figure 46 & see Figure 4). The skull was covered with brown clay (19285); this formed the shape of an animal head, and would have been moulded directly on to wood peg that supported the installation. The feature was covered with approximately 10 layers of white plaster (19287), representing repeated plastering of the northern wall. A single layer was then applied to the feature and painted red (19286), followed by further repeated layers of white plaster (19077).

At the western side of the north wall the white plaster, (19549), overlaying the red painted hands was fully excavated. It was sealed by a small area of red paint (19548), which may be the remains of a truncated decoration. This was sealed by the grey make-up, (19547), for an incised panel. This decorative panel was covered by at least one layer of red paint, (19546) / (19049). The decoration was divided into three panels; two square panels were divided by a rectangular panel with a zigzag design (Figure 47). The square panels were divided into eight

segments by four straight lines. Each segment was decorated with an incised spiral motif. The meaning of this decoration is hard to ascertain, one suggestion was that it represents phases of the year, with the sun at the centre represented by the intersecting lines.

Figure 47. Incised decorative panel. Photo Jason Quinlan

The east wall

The brick and mortar of the eastern wall was covered by a thick initial layer of plaster and then approximately five thinner white plasters. This was overlain by a layer of bright red plaster (19556). The extent of the plaster was truncated by the burning of the building; however it survived in a small area on the eastern and southern wall. After this early red painted phase the wall was repeatedly plastered with white layers, (19537). The northern area of the east wall was also decorated with red hand prints and geometric paint decoration. These were recorded during the 2010 season (see 2010 archive report) and no further excavation of them was undertaken this year.

Northern floors and burials

The burials in Building 77 were focused on the northern area of the house, following a similar pattern to other buildings excavated in the 4040 Area. In Building 77 this northern area contains the most elaborate decoration, including the wall paintings described above. The platforms in this northern area were painted red at different points in the building's life. The northeast platform was especially elaborate, being decorated with two cattle horned pedestals, and was the main focus of burial activity in the building.

Figure 48. Burial F.3620 contained the disturbed remains of at least three individuals; a young adult (c.20-29 yrs old) male (19541), a middle adult (c.30-40 yrs old) male (19554) and the skull of a juvenile, (19557). Photo Lori Hager

The burial sequence in Building 77 was not fully excavated due to time constraints, and there are likely to be a number of further inhumations still to be exposed in the building. The earliest burial excavated was F.3616, which contained the disturbed remains of a middle adult (c.30-40 yrs old) female (19529). The grave fill, 19526, was sealed by a platform surface on which two bucrania were set and then the entire platform painted red, (19267).

Figure 49 Burial F3615, the skull of an old female with carbonised residue. Photo Daniel Eddisford

Despite the fact that the bucrania restricted access to the northeast platform, a number of burials were dug into the platform after they were erected. Great care must have been taken to ensure the installations were not damaged during the burial process.

Burial F.3620 contained the disturbed remains of at least three individuals (Figure 48); a young adult (c.20-29 yrs old) male (19541), a middle adult (c.30-40 yrs old) male (19554) and the skull of a juvenile, (19557). The grave fill (19540) also contained a number of loose bones (19290).

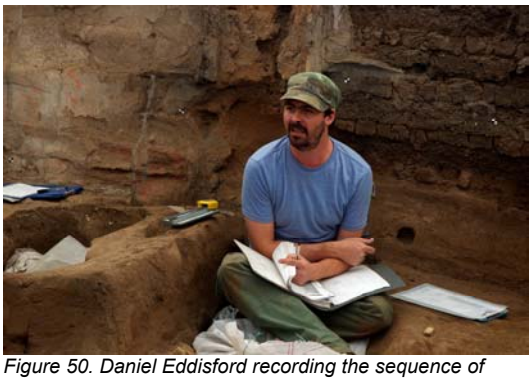

Figure 50. Daniel Eddisford recording the sequence of burials in the NE platform. Photo Lori Hager

This burial was sealed by (19539), a series of white plaster floors on the northeast platform F.6051. Cutting this deposit burial F.3619 contained an older adult (over 50 yrs old) female, (19535). This skeleton appears to be associated with skull (19501), which was recorded in the field as a different individual. Burial F.6051 was sealed by a series of white plaster floors (19520).

These floors were truncated by F.3615. This intriguing burial only contained the skull of an older adult (over 50 yrs old) female, (19500). The skull was blackened by the fire (Figure 49)that destroyed the building and was resting directly on top of a small stone pallet with cinnabar on it (see Clay and landscape studies - Chris Doherty below).

The last feature, F.3612, excavated from the northeast platform this season was a small pit, (19283), filled by homogenous brown clay silt (19281). The fill of this feature contained a number of disarticulated juvenile human bones. However, this feature does not appear to be a burial and the bones are probably residual, belonging to the earlier burials this feature truncated (Figure 50).

Northwest platform F.3617 and F.3611

In the earlier phases of the building the northwest and north central areas of the building were covered by a single large platform F.3617. The latest floors, (19532), were excavated from this feature. Over these surfaces a thick red brown deposit, (19530), formed the core of F.3611, a platform in the northwest corner of the building. The core of the platform was covered with a series of red and brown surfaces, (19524). These were sealed by a small area of patchy white floors, (19523). At this point the platform was built up by least 130mm with a deposit of brown clay (19519). The enlarged platform was repeatedly replastered with white clay (19516) and (19517) and was painted in its final phases. The platform was poorly preserved, having been heavily truncated by cut (19518) at the end of its life.

An enigmatic feature, F.3613, consisted of a tall skinny bin-like structure built out of pise-like material, (19550), and repeatedly plastered with white marl on the inside and outside. The function of this feature is not clear. A similar feature, F.1656, in Building 49 was of similar form, dimensions and construction; both features were located on the northern wall, at the northeast corner of the northwest platform. Feature F.3613 was approximately a metre high and 0.4m wide. The truncated remains of a top to the feature survived, however it could not have been fully enclosed as it was repeatedly plastered on the inside. The rounded base of the feature contained a 0.1m thick layer of what appears to be degraded chalky limestone or marl, (19270). This deposit is possibly raw material for plaster production (see Figure 100). This unit was only partially excavated. If the feature was not used for storage it may have been a lighting installation, containing some form of flame for light. Its location on the northern wall would have provided dramatic lighting to the installations and decoration on the north wall. The incised decorated panel (19546) / (19049) appears to be associated with F.3613, coming inside the bin slightly. Again this would have been even more striking if it was lit from the side by F.3613.

After the cutting back of the northwest platform F.3611 a large bin-like structure F.6050 was built in the northwest corner of the building (Figure 51). Built out of pise-like material (19265), (19276) and (19277) this structure appears to have been a storage installation (see 2008 and 2010 archive reports for more information).

Southern floors and features

An early, unexcavated, phase of the oven cuts deeply into the southern wall. This large oven has a burnt red lining and was filled with a soft dark grey packing (19551), which contained large pieces of laminated plaster and significant amounts of charcoal. The fill was only partially removed; initially the feature was thought to be a niche. The oven was blocked off and a series of smaller ovens built in front of it.

Figure 51. Building 77 under excavation, looking W. NW platform F.3611 F.6050, with bin type feature F.3613 at it's NE corner, and general view of the oven/hearth sequence to the south of the building whilst the carbonised timber posts are under discussion. Photo Jason Quinlan

Two small ephemeral hearths were cut into the base of the large oven, indicating it fell out of use for a period of time. The earliest hearth cut (19562) contained a red baked fill and was truncated by a second hearth cut (19560). The later hearth contained a similar baked material, with patches of a burnt lining surviving in places.

Oven F.3621 (Figure 52) consisted of a heavily truncated clay superstructure (19510) / (19527) and two oven bases (19555) and (19513). Directly to the east two compact burnt deposits (19508) and (19506) represent the bases of an oven or hearth F.3618. The feature was truncated by the construction of platform F.6060. Given the location of the feature, and the fact there is already an oven in use in the building, it is likely that this feature represents an early hearth. In the later phases of the building the hearth is moved from the southern wall to a more central location (see 2010 archive report).

Figure 52. Oven F.3621. Photo Daniel Eddisford

A series of floor deposits (19531), (19293), (19289), and (19272) represent a long sequence of multiple floors at the base of the ladder. The regular addition of floors resulted in a small platform F.6053 to form at the base of the ladder. Between this platform and the southwest

platform F.6058 were a series of ashy floor deposits (19522) and (19514). These represent a mixture of ash rake out from the fire installations and accumulated occupation debris.

In the southwest corner of the building platform F.6058 was used for food preparation and cooking activities in the building. The earliest make up for the platform excavated this season, (19528), contained obsidian flakes and 14 small rounded stones; four bivalve shells were found in the centre of the platform. A series of floors, (19515), were overlain by a thick plaster floor (19511). This deposit contained frequent shell fragments and obsidian flakes; an unworked stone was found against the southern wall. This surface was cut by a sub-rectangular plaster basin (19274). Set into unit (19511) a large quern stone (17547) is in situ, presumably used in food preparation. Directly below the quern stone a layer of charred organic material (19509) may be associated with the processing occurring in this part of the house, or may represent textiles laid under the quern.

The deposits in the base of a heavily truncated feature F.3610 were burnt in the fire that destroyed the building. This gave them the appearance of hearth bases, however the location of the feature suggests it is a bin rather than a fire installation. The base of the feature was repaired frequently; deposits (19505), (19504), (19503), (19299) and (19298) represent repairs and additions to the base of the feature. These deposits contained significant amounts of shell and obsidian flakes. The feature was filled by burnt mixed building debris, (19282), which probably represents the remains of superstructure of this feature.

After bin F.3610 fell out of use it was turned into a small bench of pedestal F.6059. The core of the feature was constructed of burnt material (19280). This was overlain by a series of floors (19279) and (19268). The later deposits on this feature were removed during the 2010 season.

West Mound Excavations

Trench 5 - Peter F. Biehl, Jana Rogasch and Eva Rosenstock

Team: Célia Basset (4), Peter Biehl (1), Rachel Bingham (3), Jacob Brady (1), Jennifer Byrnes (1), Bela Dimova (3), Ingmar Franz (6), Daniel Griswold (1), Xosé Luís Hermoso Buxán, (3), Ditte Kvist (7), Eva Maria Mihan (2), David Orton (3), Sonia Ostaptchouk (5), Jana Rogasch (2), Eva Rosenstock (2), Hannah Sainsbury (3), Patrick Willett (1)

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Summary
During a four-week field season, excavations in Trench 5 continued with a team of twelve and two workmen. The main objective of the 2011 season was to obtain complete outlines of three buildings (Buildings 105, 106 and 107) in the southern and western part of the trench, parts of which have been excavated in previous years (Figure 53). In order to achieve this task Trench 5 was extended to the west by 2m and to the south by 2.5m. In the extensions, several post-Chalcolithic features, including four burials from the Late Roman/Early Byzantine period and several Byzantine pits were excavated, out of which one stands out due to its size, shape and fill. The 2011 season also provides further knowledge of the dynamics of spatial organisation within a West Mound neighbourhood. The analysis of depositional histories of the Trench 5 room fills was continued and a sampling project on building materials was started.

Buildings in Trench 5
After the 2011 season, complete outlines of four buildings (Building 98, Building 105, Building 106 and Building 107) are now visible in Trench 5. Apart from this, parts of up to ten other buildings have been reached below (Space 453, Space 461, Space 462) or next to (Space 446, Space 345, Space 447; spaces going along with walls F.3354, F.3345, F.3350, F.2429/F.3327) those four complete buildings.

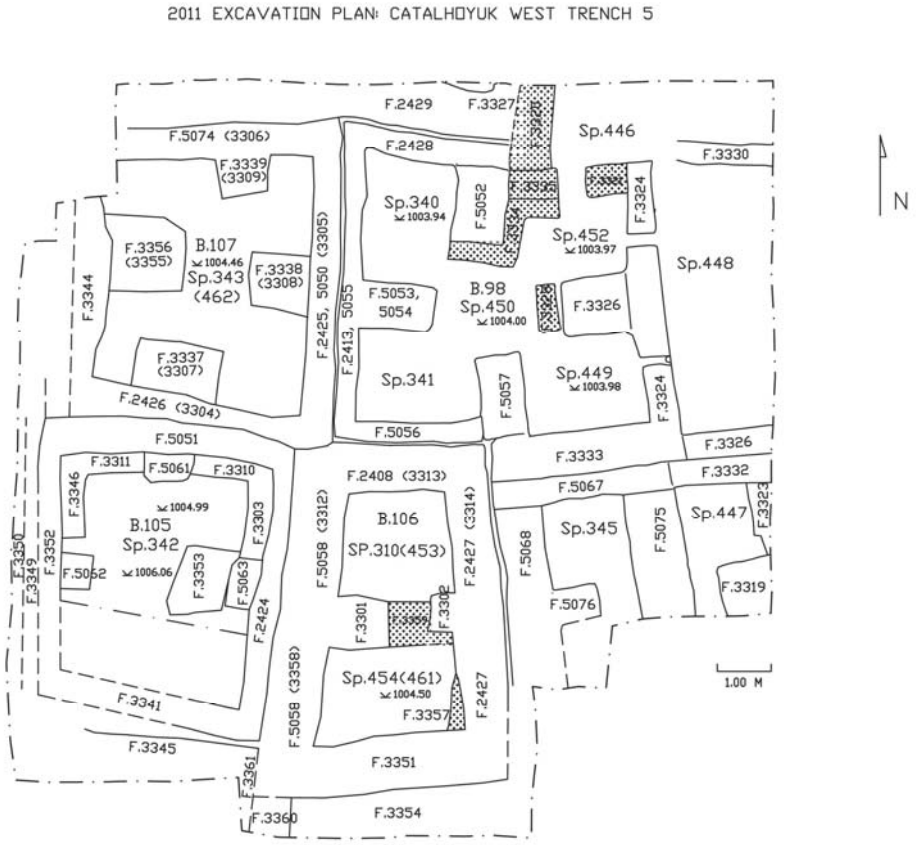

Figure 53. Plan of construction features in Trench 5 after the 2011 season. Plan West Mound Tr 5 Team.

B.105 consists of the large Space 342, whose northeastern part has been excavated since 2007 (Figure 54). The southern and western parts, exposed in the trench extension, are badly disturbed by late burials (F.3340, F.3347) and pits, so that the southern and western walls F.3341 and F.3352 only just became partially visible in 2011 and the fill in the southern building remains unexcavated, providing a large room fill section. Many internal construction features along the walls are visible in the northern part of the building and were called benches so far, but now are already up to 40cm (F.3303) high above the excavation level of the room fill and might not have served to sit on, but served other purposes. A large platform-like construction (F.3353) was found abutting buttress F.5063 and structuring the centre of the room. All buttresses and benches/platforms were partially destroyed before fill covered them; this might indicate damage happening while the abandoned building was exposed to the elements and/or deliberate destruction of walls. Building 105 was found to be neighbouring other buildings whose walls became visible south and west of it, with the west showing the unusual situation of three walls (F.3352, F.3349, F.3350) running parallel next to each other, suggesting that not all three were constructed/used at the same time.

Building 106 is completely excavated with the northern part (Space 310) having been investigated since 2007 and the southern part (Space 454) nearly completely destroyed by a large Byzantine pit (F.3331; see below). The southernmost part was exposed this year, along with a building (going with walls F.3351, F.3360) abutting it in the south. Also new is the finding of walls F.3358 and F.3357 under Space 454, surrounding a building or part of a building (Space 461) under Space 454. This older building Space 461 would have been bordered by walls F.3357, F.3358 and F.3359, the latter separating it from the small building

Figure 54. Building 105 with internal construction features and room fill; southern half remains unexcavated. Photo West Mound Tr 5 Team.

Space 453 in the north. The southern limit of Space 461 is not yet clear as no wall has been found under F.3351 of Space 454 yet, what, however, might be due to the disturbances caused by pit F.3331 and burial F.3343. Space 461 might therefore have been larger than Space 454. Space 453 in the north was a very small room with no ground-level access visible yet. Building 106 was built on top of the eroded and/or cut walls of Spaces 453 and 461 following nearly exactly the outlines of the older walls, except for southern wall F.2427, which is narrower than the older wall F.3357. The two buttresses of Building 106, F.3301 and F.3302 were built on top of wall F.3359, which turned out to be a separate construction feature, not part of F.3301 as suspected last year (Biehl – Rogasch – Rosenstock 2010). The top of wall F.3359 might have served as a threshold in the passageway between the two buttresses in Building 106. This indicates that the older walls still were visible or remembered at the time B.106 was built; however, thin packages of fill separating F.3312 from F.5058 and F.3313 from F.2408 also point towards a period of infilling or erosion in between the abandonment of the older and the construction of the younger buildings. Remains of a plaster floor were found in the northeast corner of Space 310 (associated with cluster U.15365, Figure 10, see below) below the bases of the surrounding walls, but on one level with the potential threshold between the two buttresses and with remains of a plaster surface U.16932 in Space 454. The relation of the latter to surrounding features is blurred by the destructions caused by pit F.3331, but the plaster does run up to lower wall F.5058, thus indicating that it was a floor in Space 454. This floor might have been undisturbed before the Byzantine pit F.3331 was dug through it, thus provide a sealed, mostly undisturbed Chalcolithic context that we are very much looking forward to excavate in 2012. This stands in contrast to the northern room in Building 106 (Space 310), where the floor apparently was destroyed either by a late pit similar to F.3331 not recognized during excavation or during the Early Chalcolithic prior to infilling leaving only a small rest in the northeast corner (U.18349) and where therefore the room fill is not clearly stratigraphically separated from the fill of Space 453 below – both spaces might even have been filled during one single accumulation period.

The larger parts of Building 107 and the building Space 462 under it were excavated in 2009, the western part remained hidden in the section, though. Through extending the trench, the western wall F.3344 of Building 107 could be attested. F.3344 was found to be sitting on a thick package of very homogenous fill that is interpreted to have been deposited on purpose to form a support for the wall. F.3344 therefore was not sitting on top of an older wall, differently from the other walls (F.2426, F.2425/5050, F.5074) of Building 107. The existence of a western wall of the lower building Space 462 is suggested by buttress F.3355, found on the same level as the other buttresses F.3307, F.3308 and F.3309 of the space and built from the same material. This western wall should be found slightly further west than F.3344, thus making Space 462 slightly larger than Building 107. Puzzling is the existence of a buttress F.3356 sitting directly on top of F.3355, but below the base of F.3344. F.3356 thus cannot be the western buttress of Building 107, although it was built from the same grey brick with crumbly red mortar (see Table 1) as B.107 was. It is not clear at the moment what building and phase the buttress belongs to.

Figure 55. Threshold with possible step U.16941 between Spaces 452 and 446. Photo West Mound Tr 5 Team.

Most construction features in and around Building 98 and their sequence (see Biehl – Rogasch – Rosenstock 2010) were already discovered in the previous years; some details could be investigated this year. A step-like feature (U.16941) was found between Space 451 and Space 446, confirming that these two spaces were at some point connected and used together (Figure 55). The step could not be linked to any of the sequence of eight floors investigated in northern Space 446, though, as these are disturbed in the centre of the room. Space 452, as the other spaces in Building 98 does not have a floor. Another puzzling feature (U.15373) was found in Space 450 in the centre of the building (Figure 56): Several blocks of marl of different colours from white to red set next to each other in a rough way, but recognisably with purpose. The feature forms an irregular rectangle, it was set directly abutting both buttress F.5057 and buttress F.5052 and in parts it looks like the plaster of the feature was lipping up against the plastered surfaces of the two buttresses. Bench F.3334 was constructed on top of a thin layer of fill on top of this marl construction feature. The function of the feature remains unclear, also because its base is not yet reached – it must be below the bases of the surrounding walls and buttresses. It might have been the attempt to construct something floor-like or a disturbed installation in the centre of Building 98.

Figure 56 Marl feature U.15373 in Space 450. Photo West Mound Tr 5 Team.

Early Chalcolithic Buildings: Layouts, Sizes and Biographies

With now four buildings visible in the trench, it can be said that buildings excavated in Trench 5 have important similarities, but also differences, concerning their layout, size, biography and probably function. While large internal buttresses are a common feature of all buildings

excavated in Trench 5 so far, the buildings have all different layouts: Building 105 has much more internal furnishing than the others (see above). Building 106 is much narrower than the others. Building 98, at least in its second phase (see Biehl – Rogasch – Rosenstock 2010) had an annex in the northeast. Building 107 has the symmetrical shape that might represent the construction principle for an Early Chalcolithic house on the West Mound. The sizes vary between 4.5m x 4.5m (internal measurements) in the case of Building 98 to 4m x 2m in Building 106. If Spaces 453 and 461 really turn out to be one small building each, these structures only measure 1.5m x 2m and 1.7m x 2m each.

Still, no unroofed open space has yet been identified in Trench 5; south and west of the newly defined buildings, the walls (F.3349, F.3350, F.3345, F.3354) of other buildings became visible, neighbouring Buildings 105, 106 and 107 with only 2-3cm gaps in between. An exception might be Space 448 excavated last year (see Biehl – Rogasch – Rosenstock 2010). Another potentially unroofed open area might just have become visible under Building 98 (see below). The existence of open areas has already been discussed in Trench 7 (Biehl – Rosenstock 2008).

Three buildings (B.98, B.106, B.107) are now excavated to below the bases of their walls; all three have different biographies revealing the change or continuity of use and meaning of a certain spot within the settlement over time: While B.107 seems to have been erected directly on top of a building with identical or similar outlines (Space 462), Building 106 seems to be standing on the remains of two small rooms, thus carrying on the tradition of built space in this spot, but with different layout and probably function. Thin layers of fill separate the bases of Building 106 walls from the walls below, indicating a period of sediment accumulation between the abandonment of the older buildings and the erection of Building 106. Construction of new buildings on the walls of older buildings is a habitus that connects West Mound inhabitants to their East Mound predecessors; on the East Mound, this behaviour was interpreted as supporting the creation of kinship and family lines by Düring (2006), while Matthews (2005: 133,145) stresses structural favours of using older walls as foundations.

Figure 57. Trampled surface U.16947 in/under B.98. Photo West Mound Tr 5 Team.

During the last days of excavation in 2011, it became clear that in Spaces 449, 450 and 340 of Building 98, excavation had already reached a level below the bases of the walls (3-5cm below the bases in Spaces 449 and 450, up to 15cm in western Space 340) and hit fill underneath the walls and the rooms (see Figure 3). The walls of Building 98 do not seem to

be sitting on older walls at the moment; the building might have been erected on top of a package of fill that, judging from the observations in (below) Space 340, where this fill has been excavated down up to 15cm already, might be a midden, that is a place dedicated to the refusal of all kinds of material. There was no floor or trampled surface going along with the base level of the walls surrounding the building; in Space 449 and reaching into southeastern Space 450, a trampled surface (U.16947) was identified that might have been the walking level during the use of the spaces, but was found below the bases of some walls (Figure 57). F.2413/5055 in Space 340 was built directly onto a fill layer containing much ash (U.16951), otherwise rarely found in West Mound room fills (Figure 58). Such an ash layer would not form a stable support for a wall nor a good walking ground, but apparently it was used in this way. It turned out to be difficult to distinguish whether some fill lenses were fill in Building 98 or fill below the building (see below). Deciding what fill was deposited before Building 98 was built will require careful stratigraphic analysis. It seems clear, though, that the fill underneath does not seem to have been manipulated in preparation as building ground before the erection of B.98. If a floor existed, it was very thoroughly destroyed before the building was filled in. Apparently it was not thought to be necessary to prepare a stable foundation and a nice, even, well-constructed floor or walking surface for Building 98.

Figure 58. Space 340 in Building 98: ash lenses U.16951 of the fill under the wall bases, clay balls sticking under the wall. Photo West Mound Tr 5 Team.

Layouts, sizes and biographies of Trench 5 buildings can be combined to interpret functions of these spaces. Buildings 98, 106 and 107 do not give the impression of having been living areas, as they have a small and fragmented internal surface and might not have had constructed floors. Also the massive buttresses suggest the existence of an upper storey with more open plan used for living purposes, but no evidence of such a storey was found in the Trench 5 room fills so far (see below). The parts of the buildings excavated would then be the lower storeys that might have been used for purposes not requiring much light, space, comfort and movement, such as storage. Building 105, with less massive buttresses and more internal furnishing, might be an exception. Building 106, being smaller and narrower than the other buildings, and especially Spaces 453 and 461 below might have served mainly or only non-living purposes.

Building Stratigraphy

Interpreting which of the buildings found in Trench 5 were standing and used contemporarily is absolutely crucial for the interpretation of chronological developments related to for example building techniques, function of buildings, artefact production and use and subsistence economy, and for an understanding of the spatial structure and internal organization of a West Mound neighbourhood.

On the one hand, analysing the vertical stratigraphy of buildings sitting on top of each other (Building 106 on Spaces 453 and 461; Building 107 on Space 462) is certainly the easiest task, although estimating the time that passed between the abandonment of the lower building and the construction of the upper one already is challenging. Investigating horizontal stratigraphy, on the other hand, is quite complicated, as Trench 5 is situated at the edge of the tell which probably already was sloped or terraced at the time when Buildings 98, 105, 106, 107 and the others were built. Buildings separated by a gap of only 2-3cm can be

expected to have been standing, but maybe not used, at the same time. The buildings, however, most probably were not all constructed and abandoned at the same time. The south wall of B.98 (F.3333, F.5056) has a non-linear, bended outline that might indicate that it was constructed to fit alongside the pre-existing northern walls of Building 106 and Space 345, making those two buildings older than Building 98. There are no such indications concerning the construction chronology of Buildings 105-107 so far.

Attesting that buildings were occupied contemporaneously is especially complicated in Trench 5, as the internal biographies of buildings are already complex, and it is very difficult to stratigraphically link certain phases of use, abandonment and (re)building of one building to those of the next phase. Building 98 (Figure 59), so far, has proven to have the richest biography, including at least one phase of abandonment and infilling before a refurnishing event (see in more detail Biehl – Rogasch – Rosenstock 2010; in 2011, it could be confirmed that features added later, that is F.3328, F.3329 and F.3334, were sitting on a package of fill that can be clearly separated from the fill over these features when observing the components of the two fill packages). Careful stratigraphic observation and artefact analysis supported by 14C dating, which has been started this year, can hopefully be combined in post-excavation analysis to reconstruct the complex pattern of buildings having been constructed, used, abandoned, re-used as middens, refurnished and re-used within a West Mound neighbourhood.

Figure 59. Building 98 at the end of the 2011 season: Plaster feature U.15373 in the central room, surface U.16947 in the southeast (lower right corner), ash lenses U.16951 In the northwest (upper left) and step U.16941 in the northeast (upper right). Photo West Mound Tr 5 Team.

Room Fills and Infilling Processes of Buildings

As general characteristics of Trench 5 room fills have been described in earlier reports, only special findings from the 2011 season shall be discussed here. Generally, nearly all deposits uncovered represent secondary deposits, that is material deposited in the buildings after they got out of their use which most probably was situated elsewhere (Figure 60). A striking exception to this pattern might be the clay ball cluster (U.15343; see ceramics report by Ingmar Franz) discovered in Space 449 in Building 98 last year whose excavation was finalised this year. Another exception might be the deposits filling lower Building 107 and upper Space 462 underneath, which contain unusual high amounts of mud brick lumps with very few artefacts (U.15394, U.16945) and causes discussions as to whether they represent in situ collapse or a secondary deposit of building material refuse. Whether primary or secondary, major parts of the materials making up the room fills seem to have been deposited

within a short amount of time, as is indicated by the preservation status of animal bones. The animal bones also indicate that the time of accumulations varies between the different rooms or parts of rooms (see faunal report by David Orton).

Figure 60. Room fill in Space 446 (Building 98) with burnt plaster pieces U.15830. Photo West Mound Tr 5 Team.

During the last years, it became clear that the stratigraphic units making up Trench 5 room fills can be described as smaller and larger lenses rather than layers – lenses typically having a flat form, being thicker in the centre, having undulating boundaries and not covering whole rooms. Cleaning the large southern and western room fill sections of Space 342/Building 105 in the beginning of the season confirmed this impression and attested that the fill lenses generally slope towards the centre of the room, suggesting that the room was filled from its sides. Room fill excavations now attempt to identify these lenses during excavation, observing colour, matrix and inclusions of the fill. These aspects also led to the interpretation of Building 98 having been filled by two distinct infilling periods: The fill reaching up to about the base level of the internal construction features F.3328, F.3329 and F.3334 (thus pre-dating the re-furnishing and re-use of the building) is much more heterogeneous than the fill covering those features. The lower filling episode also has many more artefacts such as large pot sherds, unfired pottery, bone tools, clay balls, animal bones, lithics (see lithics report by Sonia Ostaptchouk) and building material refuse.

Figure 61. Meta-andesite mace-head from Space 454 (U.16960, U.16967). Photo West Mound Tr 5 Team.

The fill that became visible under B.98 might differ from the fill in the building in some ways, one of which might be the existence of ash (U.16951 under Space 340), which seems to be lacking from room fill excavated in Trench 5 so far, at least in larger quantities. Observing a sequence of three distinct depositional episodes and their components such as the fill below Building 98, the fill in lower Building 98 (accumulated between the two use phases of the building) and the fill in upper Building 98 (accumulated after the building was not occupied any more) could lead to interpretations about the development of subsistence, artefact production and refuse behaviour over a certain amount of time.

Some unusual finds deserve mentioning. Excavation in Space 345 produced especially many unfired pot sherds and clusters of them, along with large parts of fired vessels. The few remains of original Chalcolithic fill of Space 454 (U.16960, U.16967) produced some rare artefacts such as a duck-shaped miniature vessel (see ceramics report by Ingmar Franz, Figure 13 and Figure 14), a mace-head made from a remarkable, colourful meta-andesite stone (Figure 61) and several nearly complete vessels (see report by Ingmar Franz). Removing the remains of a plastered layer in the northwest corner of Space 310, may represent a fragment of an original plastered floor of the Space, most of which had been removed before the space was filled in, uncovered two large and articulated animal spines and a goat horn pair with attached, potentially reworked (see animal bones report by David Orton), parts of the skulls, along with smaller fragments of bones and large pot sherds (cluster U.15365) (Figure 62). The cluster could be interpreted as an intentional deposit under the floor in the northwest corner of Space 310; maybe the people that removed the rest of the floor (see above) were aware of the existence of this depot and therefore left the floor in this corner intact.

Figure 62. Potential deposition of goat horns U.15365 in the northeast corner of Space 453 with floor remains U.18349. Photo West Mound Tr 5 Team.

Building Material Sampling

Soil blocks were taken by Lisa-Marie Shillito from walls F.2424, F.2425/5050 and F.2413/5055 in Building 105, Building 107 and Building 98. The thin sections are currently prepared by Julie Boreham in Cambridge and will be analysed and interpreted in Berlin. Funding for the project comes from the Free University Berlin.

The thin sections of building materials shall allow a microscopic view onto the mud materials which macroscopally already appear to be very varied and to go along with different techniques of construction. This variety of building materials and techniques is described in more detail in Biehl – Rogasch – Rosenstock 2010 and summarised in Table 1. The different materials must be the outcome of the choice of different mud sources and temper by the constructors of Trench 5 buildings, but the implications of these choices remain to be explored. Along with the soil samples from walls, blocks taken from the large room fill section in Building 105 are prepared for analysis, which can give further insight into the components of the fill.

	building material	**construction technique**
B.105	dark grey, crumbly brick (ashy temper?) with white (marl?) mortar	bricks, detailed construction not clear
B.98	grey (re-used?) brick with large inclusions of pottery, bone, light (fresh?) clay, burnt clay, charcoal	rammed earth?
B.107	grey brick with hard, crumbly, reddish-grey mortar	bricks, detailed construction not clear
B.106	grey brick with light grey mortar	bricks, walls bind into each other
Sp.447, Sp.345, additions B.98	grey brick with light grey mortar	bricks, wall abut each other
Sp.461, Sp.453, Sp.462,	grey brick with light grey mortar	bricks, detailed construction not clear

Table 1: Variety of building materials and construction techniques in Trench 5

Post-Chalcolithic Features
Many large post-Chalcolithic features disturb the prehistoric remains in Trench 5 down to quite high depths. Apart from numerous smaller pits, three burials from the Roman/Early Byzantine period (F.3340, F.3342, F.3343, F.3347; see human remains report by J. Byrnes) and one large Byzantine pit F.3331 were excavated in the trench extension 2011 (Figure 63). The two burials F.3340 and 3347 over southwestern Building 105 lacked any recognisable grave construction and were only partially preserved. F.3342, which cut into the northwest corner of Building 107, had a well-preserved mud brick lining containing the remains of a child. The well-preserved cist of red burnt brick of F.3343, over southern Building 106, had apparently been disturbed by an event that also removed the body buried here.

Figure 63. Large Post-Chalcolithic pit F.3331. Photo West Mound Tr 5 Team.

The northern part of the large bell-shaped pit F.3331 was already excavated last year; after extending the trench towards the south, the whole pit became visible. This massive pit cut away most of the original fill of Space 454 in Building 106 along with parts of buttresses F.3301 and F.3302 and wall F.2427; it also cut into the fill of Space 462 below Space 454. The pit blurred the recognition of building phases in Building 106 and the structures below. The pit was filled (U.15387, U.16928) mainly with re-deposited Chalcolithic material and artefacts, among which a fragment of an obsidian bracelet is remarkable, and with re-deposited Byzantine or Roman burial remains such as stones, tile, brick and human bones. The pit can be dated by a coin (U.16928), which gives a terminus post quem.

Outlook
It is planned to deconstruct the walls of the fully excavated Buildings 98 and 106 at the beginning of the 2012 field season. This will provide important information about the construction techniques used as well as about the building phases of these two buildings. The removal of Building 98 will also enable us to further investigate its complicated building biography (see Biehl – Rogasch – Rosenstock 2010) and better understand a possible midden underneath; below Building 106 parts of two other rooms or buildings (Spaces 543 and 461) already are visible and shall be investigated in more detail. The soil blocks from walls and from the room fill in Building 105 will allow for a first microscopic glimpse into the components of building materials and room fill in Trench 5.

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CULTURAL AND ENVIRONMENTAL MATERIALS REPORTS

Faunal Team 2011

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West Mound Animal Bones 2011, Trench 5 - David Orton

Summary
Excavation in Trench 5 during 2011 continued in Building 98 and in four adjacent partially defined buildings. Faunal study concentrated on B.98, Sp.342, Sp.345, and Sp.453, each of which is discussed briefly here. As in previous years, effort was focused on conducting detailed assessments of a broad range of material, in order to (a) provide rapid feedback to the excavators, (b) avoid a backlog of entirely unstudied material, (c) develop a frame of reference for West Mound faunal deposit types, and (d) provide immediate - preliminary - quantitative data through recording of measurements and diagnostic zones (DZ). Nonetheless, seven units were also recorded in full. The material studied this year was split between units excavated in 2011 and those excavated towards the end of the 2010 season.

Building 98
The definition of B.98 at the end of the 2010 season confirmed that spaces Sp.340, Sp.341, Sp.449, Sp.450, and Sp.452 could be considered parts of a single space partially divided by the building's four buttresses. In view of differences in room fill contents between these five spaces, however, they continue to be referred to individually here. Sp.446 may also be related to B.98, but as yet no faunal material has been studied from this space. Faunal study within B.98 has concentrated on the most extensively excavated (south-east) segment, Sp.449, although individual units from Sp.340 and Sp.450 have also been assessed.


Figure 64. Red deer metatarsals associated with surface in Sp.340, Building 98 Photo Jana Rogasch.

B.98 is notable for concentrations of unfired clay balls in what are assumed to be its lower fills, particularly in Sp.449 (no obvious floors have been uncovered in most of the building), accompanied by whole and partial pottery vessels. Amongst the faunal remains there are several unworked antlers, an unusual number of antler pre-form cylinders, a range of bone tools and expediently used bone fragments, and numerous caprine horn cores. Given the interpretation of the unfired clay balls as storage of clay for pottery production (Franz 2010), it is notable that many of the faunal remains can be seen in terms either of raw material storage or of the early stages of production. Sp.340 also features two almost complete red deer metatarsals laid side by side on a burnt surface (Figure 64); these are perhaps the single most useful element for production of many bone tool types, and derive from a species that is otherwise very rare amongst the fauna at Çatalhöyük (with the exception of its antlers).

Two faunal units from Sp.449 were studied in full during 2011 (15343, 15370) and a further unit was assessed (15180). The latter, from just above a major clay ball concentration, appears to contain a mixture of fresh, primary material - characteristic of many Trench 5 units,

including the immediately overlying (15160) - and the more fragmentary, reworked specimens that might be expected in a conventional room fill. Unit (15343), representing bones associated with the clay ball cluster itself, contains less primary material, while (15370), from beneath the main clay ball concentration, looks like a typical secondary/tertiary room fill as known from the East Mound: there is a fairly low density of bone, and most fragments are weathered and highly fragmentary.

Two units from other parts of B.98 were assessed. Unit (15340), from Sp.450 in the centre of the building, resembles (15180) with around half the material appearing homogeneous and well preserved while the remainder is heterogeneous, fragmentary, and probably reworked. Unit (15144), from Sp.340 in the south-west corner of B.98, would be considered a typical room fill on the East Mound, consisting of fragmented material of varied appearance with fairly frequent carnivore damage and no articulations.

Sp.310, Sp.453, Sp.454

Sp.453 lies immediately beneath Sp.310, but was given a new number since a break in the walls indicated two superimposed spaces. Since no apparent floor was noted during excavation, however, it is not clear to what extent the fill units assigned to each space should be treated separately, or where the dividing line between the fill of the earlier and later space actually lies. For the time being, therefore, these spaces are considered together.

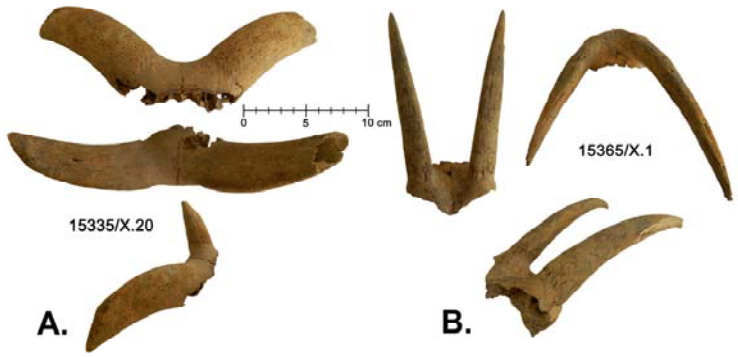

Figure 65 Caprine frontlets from Sp.453. a) sheep frontlet 15335.X20; b) goat frontlet 15365.X1. Image Ingmar Franz.

Sp.454 lies to the south of Sp.310/Sp.453 and is accessible from it, but a post-Chalcolithic pit has destroyed almost the entire original fill of this space. The rich bone material from this pit, including a near-complete equid skull, may be of considerable interest in its own right but is not within the core remit of the project and will not be a priority for study. The pit comes down onto a surviving Chalcolithic floor, however, which should eventually help to understand the phasing of material from the adjacent spaces.

As described in previous reports, the fill of Sp.310 exemplifies the kind of lightly processed, highly coherent, and minimally disturbed primary deposits of that are a notable feature of Trench 5. This pattern continues in the uppermost fill unit assigned to Sp.453 - (15335) - which was assessed this year. The unit contained numerous in situ articulations, including an entire sheep foot from the distal radius down, even including some of the sesamoids, but the most remarkable find was a pair of sheep frontals with complete horn cores, found in the north-west corner of the unit and recorded as 15335.X20 (Figure 65a).

The next fill layer down, (15363), is a distinct contrast, consisting only of a few small, probably reworked specimens. The north-east corner of this unit, however, featured an unusual installation consisting of a bulge or dome of plaster, beneath which was found a concentration of articulated bone embedded in compact sediment, designated as cluster (15365). This cluster was fully recorded and included a sequence of four articulated caprine lumbar vertebrae, a group of four equid cervical/thoracic vertebrae plus rib fragment, and various other individual specimens. Most importantly, however, the installation featured a pair of complete domestic goat horns still connected by part of the frontal bones and recorded as 15365.X1 (Figure 65b).

The sheep frontlet from the north-west corner of the space and the goat frontlet from the installation in the north-east show remarkable similarities. Although caprine horn cores are far from uncommon in Trench 5, no others recorded thus far have featured any significant portion of skull. The numerous horn cores from B.98, for example - touched upon above - can best be interpreted either in terms of horn-working waste or of storage of horn prior to working. Both 15335.X20 and 15365.X1, by contrast, have just enough of the frontal bones still present to hold the two horns together. In both cases the bone appears to have been broken or chipped away rather than cut or chopped, but the result is nonetheless so neat and symmetrical that is hard to explain in terms other than deliberate action; the breakage certainly doesn't follow natural weak points in the bone. The purpose of these two frontlets remains obscure, but it seems clear that they were produced carefully with a view to their appearance rather than to any practicalities of horn working. Their location in adjacent corners of the space - at roughly the same level - is interesting, and perhaps hints at the presence of a destroyed or archaeologically invisible floor at this level, dividing spaces Sp.310 and Sp.453.

Sp.345

Sp.345 is part of a third - at present poorly defined - building adjacent to both of the above, and is characterised by a very dense concentration of partial pottery vessels, along with unfired pottery and clay balls. The two faunal units so far assessed from this space, (15172, 15174) were both excavated in 2010 and derive from above the densest concentrations or artefacts. Both of these units resemble those from B.98 in that they seem to contain a mixture of primary dumps of consumption waste with a substantial quantity of reworked material.

Sp.342

Much faunal material from Sp.342 was studied in 2009, but the space received little attention during 2010. Southward and westward extensions of Trench 5 created sections through the space, revealing more complex stratigraphy than initially recognised, including intrusive cut features that may have compromised some units previously thought to be secure Chalcolithic. Study of units from this space during 2011 was restricted to assessment of three uncompromised fills: (15359, 16938, 16939). All of these appear to be reasonably coherent primary deposits, albeit less spectacularly well-preserved than most units from Sp.310/Sp.453.

Faunal deposit types

As has been noted in previous reports, faunal units from the West Mound do not appear to fall into the familiar categories developed over the years for the East Mound.

Although only room fill units have so far been studied, the majority of these are very different from their East Mound equivalents. Whereas room fills on the East Mound are almost invariably heavily re-worked tertiary deposits with limited potential for faunal study, some of the spaces in Trench 5 appear to have been filled very rapidly with large primary deposits of fresh, often very lightly processed, sheep and goat remains. Carnivore damage and weathering are rare, while in situ articulations and intact articular ends are common. This pattern - suggestive of rapid burial, large-scale consumption, and relative waste – is exemplified by Sp.310/Sp.453, Sp.342, and the upper fills of Sp.449. A second group of fill units from Trench 5 are less spectacularly coherent and well-preserved, with a mixture of apparently 'fresh' bones and substantial amounts of reworked material These include the units so far studied from Sp.345 and most of those from the various segments of B.98, in both cases associated with rich artefact assemblages. One might tentatively suggest that this pattern represents basal fills, close to floors that are not always archaeologically visible, although the depositional processes responsible remain a moot point.

Quantitative taphonomic comparison between the various spaces and fills will become possible once more units are fully recorded. There does not, as yet, appear to be any significant difference in taxonomic composition between the two loose categories of fill outlined above.

Taxonomic representation

Table 2 shows the overall taxonomic composition of secure Chalcolithic units from Trench 5 studied thus far, using Diagnostic Zones (DZ). Hare, fallow deer, and wild cat are also present

in small numbers but have not, as yet, contributed any DZ, and there are also small quantities of bird and fish remains. The cattle on the West Mound appear to be primarily domestic based on size, although there may still be some hunted individuals amongst the modest overall numbers. There are also a few extremely large sheep and goat specimens, which are almost certainly wild. Since there is very little change in relative abundance from the data reported in the 2010 archive report, taxonomic frequencies are not discussed further here.

	DZ	%
Caprines	1009.5	92.94
Sheep	*529.5*	*48.75*
Goat	*116*	*10.68*
Sheep/Goat	*364*	*33.51*
Cattle	29.5	2.72
Pig (wild)	0.5	0.05
Equid	32	2.95
Red deer	0.5	0.05
Dog/wolf	9.4	0.87
Fox	3.6	0.33
Small carnivore	1.2	0.11
Total	**1086.2**	**100**

Table 2 Relative taxonomic frequencies for mammals from Trench 5.

Reference

Franz, I. 2010. Pottery Report Trench 5-7. In: Çatalhöyük 2007 Archive Report, pp.77-90

Use wear analysis on Çatalhöyük bone tools – Janet Griffitts

In this study I examine 354 bone artefacts. The analysis took place in late June through early September, 2009. Many artefacts were identified in the field and others during faunal analysis. Taxon, element, and bone condition were identified during the initial faunal analysis and artefacts were set aside for additional work. Artefacts were assigned to standard types based on overall shape, such as point, needle, ring, or bead. Any manufacturing traces still present were noted, and tools with potential use wear were examined using high power optical microscopy analysis. This section focuses primarily on use wear analysis of bone tools.

This study employs methods introduced by lithic use wear researchers (Keeley 1980). Use wear analysis was conducted using a 10X hand lens, and the unaided eye to identify manufacturing traces and other large patterns, a binocular light microscope with magnifications 25-40X, and pocket microscopes of 40, 50, and 60X magnifications. Wear patterns were compared to those found on the surfaces of a comparative collection of 180 replicated bone and antler tools, and 7 ethnographic specimens of known use. The tools in this comparative collection were used for a variety of tasks, with many contact materials and motions. Most of the experiments were designed to be appropriate for use with studies of North American materials, but most of the generalizations made concerning use wear should also be of use for the present study. Details of these experiments can be found elsewhere (Griffitts 2006), and here I present only a cursory summary of relevant use wear patterns. In the following study, bone is used as a gloss to include bone, antler, or teeth. In discussions of manufacture and use striations, longitudinal traces are those that run parallel to the long axis of the object, transverse patterns that are perpendicular to the long axis of the object, and diagonal, not surprisingly, are someplace between transverse and longitudinal.

Experiments show that traces visible to the unaided eye or a 10X handlens are usually related to manufacture rather than use (Griffitts 2006), so interpretations of use were made at higher magnifications. At the time of this study it was not possible to use a microscope with higher magnifications, and this limited certain interpretations.

Experimentally Produced Use Wear Patterns

Use wear patterns are made up of several kinds of surface modifications, including the presence or degree of rounding or flattening of surfaces, pitting, cracking, polish appearance, overall distribution, directional polish features, and direction of striations. Interpretation relies on the combination of these various traces. Striation orientation shows the direction and kinds of movements employed, and striation size and appearance can provide data on material texture. For example, the striations on tools used to work gritty, dirty hides are heavier and wider than those on tools used to work cleaner skins. Fine textured plants leave finer striations than those with coarser fibers. The distributions of polish and other features can provide clues to the material contacted as discussed below.

Experimental tools were used for a variety of activities involving many contact materials, including soft and hard materials, and wet and dry substances, basket making, fibre processing, weaving cotton, leather and hide working, wood working, pressure flaking, pottery modelling, and other activities. Use wear analysis cannot identify every exact use, but instead diagnoses general contact materials, direction of use, and motions used to interpret probable use. For example, a tool with wear suggesting that it was used with silica-rich plants in twisting motions at the tip is likely to have been employed as a basketry awl, but could have been used for another activity that involved twisting the tip in silica-rich plants.

Manufacturing processes include grinding, cutting, breaking, and deliberate polishing, all of which potentially leave traces on the bone. These processes can be subdivided further. For example, cutting, includes such methods as groove-and-snap, groove-and-splinter, shaving or whittling, and sawing. Tools made by breaking can involve deliberate flaking, or may simply take advantage of a sharp-edged spiral fracture. Manufacturing traces are usually large and can be distinguished from use wear by differences in size. Most manufacturing traces are macroscopically visible, or visible with a 10X hand lens, and are too large to be seen with higher magnification (Griffitts 2006). Use traces are usually, though not always smaller.

Details of experimental design and the resulting experimentally produced use wear patterns on bone are described at length elsewhere (Griffitts 1993; 1997; 2001; 2007, Griffitts and Bonsall 2001; Griffitts and Waters 2005; LeMoine 1991), and therefore will be given only a brief treatment here. A few broad generalisations can be made concerning contact materials. It is important to note that, with a few exceptions, these patterns only become visible at higher magnifications, 50 to 400X. Researchers seeking to find similar traces using 10 - 25X are likely to be unsuccessful. Unless stated otherwise, the discussions below are drawn from Griffitts (2006).

Soft materials

People in the past made a variety of products using leather, hide, and raw hide, including containers, clothing, and shelters. The surfaces of tools used in contact with soft materials such as leather or hide become polished and rounded. Wear patterns follow the contours of the bone surface. Pitting, usually visible at 200-400X, is often present on tools used to work leather or hide, but surface cracking is rarely seen. Unfortunately, it was not possible to examine tools at these high levels of magnification in the present study, and so many of the identifications must be tentative at this time.

Wear formed during fresh or wet hide processing tends to be more widespread than wear developed through dry hide or leather working, but these differences are subtle and are here considered together. When viewed under high magnification, the working edges of leather and hide working tools are polished, and the surface is rounded. The wear follows the contours of the bone, extending into low-relief areas of the surface. LeMoine (1991:58) describes a similar wear resulting from contact with soft materials and refers to this type of polish as invasive. Striations show the direction of movement, and are larger, deeper, and more common with tools used to process gritty wet hides or removing hair. Pitting is sometimes present but is not usually visible below 100X magnification.

Experimental tools used to weave cloth or crochet using homespun and commercially-processed cotton, and an ethnographic Guatemalan weaving tool also developed rounded and very brightly polished surfaces but these surfaces are less likely to be pitted than leather

working tools. Instead, the surfaces develop very fine surface cracking that is usually only visible at 200-400X. Cracking is only rarely seen on experimental leather or hide working tools.

Hand wear is found on some experimental, ethnographic, and archaeological tools. This takes the form of polish and rounding. The wear produced by contact with human hands during the course of a tool's use life is similar overall to that produced by leather and hide working, but the striations are less common, more widely spaced, and less patterned than those found on the working ends of tools used to work leather or hide. Hand wear is very slow to develop on experimental tools, and a tool handle with heavy hand wear probably received heavy use. Artefact transport can also create light wear patterns including patches of uneven faint polish, especially on raised areas and edges, with light rounding, patterns similar to those reported by LeMoine (1991). It is similar to poorly developed wear produced by contact with other soft materials but is more patchy in distribution than leather and hide processing with less patterned striations.

Silica rich, non-woody plants

People across the world use tools to interact with silica-rich plants in many ways, including basket-, mat-, and net- making, and preparing basketmaking materials (Bartlett 1949; Newman 1974), weaving, and processing plants for fibre (Gustafson 1980:73; Russell 1908). In North America, people not only wove baskets for storage and food processing and preparation, but also hats, capes, shelters, floor coverings, sleeping mats, sandals, and many, many other objects (Kroeber 1925). In the present experimental program experimental tools were used to weave and sew coiled and wicker baskets of several materials, cut grass, husk corn, process plant fibbers by splitting and stripping leaves for basketmaking, weave agave and yucca fibers, and other activities described elsewhere (Griffitts 2006). The experimental collection also includes two ethnographic Guatemalan tools; an antler tapiscador (corn husker) and a bone desojador ("deleafer"-used to bend and remove corn cobs from their stalks during harvest).

The surfaces of plant-working tools become polished, but the polish often has a different appearance under magnification compared to those used for soft materials, possibly because silica residues have adhered to the tool surface (d'Errico et al. 1995). The silica particles in plants such as grass, corn husks, tree bark, yucca, and agave are hard and abrasive (LeMoine 1991), and the wear produced by silica-rich plants is found on the high points of the bone surface and does not extend deeply into the lower areas of the bone surface. Consequently, the surfaces become flattened, rather than rounded and in very heavily worn tools the high points are sheared off. Surface cracking is often seen at 400X, and pitting may or may not be present. Grit particles in dirty materials produce large, sharp, non-parallel striations that are often isolated rather than grouped as are the striations left by parallel-fibered plants.

Experimental tools used to split leaves or strip the fibers from fibrous plants develop parallel striations in a flattened surface. The striations usually lead from one edge, though longitudinal striations may be present on the tool tip as well. The transverse and diagonal striations, polish and other wear traces left by plant splitting resemble those left by plant fiber stripping. A person making wicker baskets uses both the tip and the shaft of an awl. A twist of the tip opens spaces to insert a new warp, the edge of shaft presses down wefts between warps. This last motion can also cause groups of striations to form on the edges of tool shafts. Striations from wicker work generally occur in parallel-fibered groups confined within a short area. In heavily used tools these striations can form a macroscopically wavy edge. Bone awls used to make coiled baskets are inserted a short distance into the coiled fiber bundle and twisted, they are less likely to acquire grouped striations partway up the shaft than those used to make wicker baskets.

Pressure flaking

Wear traces on flint knapping tools are among the few tools that are visible with very low or no magnification. Bone and antler tools used for pressure flaking rapidly acquire gouged and battered ends; pitting, with deep, wide, sharp-edged striations clearly visible at 50X; and a faint, very patchy polish on raised areas. Tiny stone flakes are sometimes embedded in the

tool surface (Olsen 1989). Cracking occurs within the wide striations running perpendicular to the direction of the larger striation, but is often only visible at higher magnifications.

Wood working wear
Wood is neither as soft as leather or hide, nor as abrasive as the hard particles and fibers contained within silica-rich plants, and the resulting wear patterns usually falls in between the two. Polish from wood working is not as bright as that produced from working with silica-rich plants. Different kinds of wood produce some variation in wear patterns, particularly in the intensity of the polish. The wear extends further into the lower bone contours than wear from plant processing, but not as far as wear produced by contact with softer materials. When viewed under 400X, the surfaces are often cracked, pitted, and crossed by many small striations. Experiments include whittling and chiseling commercial kiln-hardened pine, smoothing willow and pine, removing bark from willow, mesquite, and very dirty, gritty juniper, and weaving a garden trellis from fresh willow branches. Different hardnesses of wood leave different patterns, but these differences are only visible at higher magnifications. Contact with soft wood and hard leather or rawhide produce similar wears and so these patterns cannot always be distinguished from one another.

Digging
Experimental digging tools used in dry, clayey soils in Boulder, Colorado and garden soil in Tucson, Arizona acquired a bright polish and deep striations and a dull polish that is visible with a 10X lens. Patches of flattening and polish (similar to those produced by contact with plants) are surrounded by generic weak polish, possibly formed by contact with roots or silica particles in the soil. These patches are generally only visible at higher magnifications.

Pottery
Clay working produces a wear pattern with deep, narrow, parallel striations that are sometimes visible with a 10X hand lens. The working edge becomes macroscopically (or at 10X) polished and bevelled. The size of the striations varies according to the temper and texture of the clay. The surface is not rounded as with leather or hide working. Wear from clay working generally suggests contact with a hard, abrasive material, but is not necessarily identifiable to specific contact material.

Microwear and burning
When tools are used and then burned until blackened, the surfaces grow shinier and appear macroscopically to be more heavily polished. This bright polish is, in fact, caused by burning, rather than by use. The surfaces of blackened bones become smoother and more rounded and experimentally-produced wear formed by contact with harder materials such as silica-rich plants, becomes more like wear created by contact with soft materials after burning. Therefore, caution must be used when interpreting wear patterns and intensity of polish on burned bones. As bones are heated, the surfaces eventually melt, become bubbly, and wear patterns are lost, but some large manufacturing traces may still be seen. At this point the bone is still black and can be very shiny. When bone is heated further it becomes calcined. The colour changes to grey or white, and when observed under high magnifications, the outermost bone surfaces of experimentally heated replicated bone tools often appear to have peeled away, and the bubbly surface is no longer present. The surface also becomes less reflective, and it is difficult to discern details of the tool surface under optical magnification. Some manufacturing traces may remain on calcined bone, but microscopic use wear traces are usually no longer visible.

Wet Materials
LeMoine (1991) noted that tools used to work wet materials are more likely to develop wear in which the osteons are exposed or outlined; the present study supports her observations. Activities in the present project that have produced this type of wear include basket making using soaked materials and the stages of hide processing that involve wet materials such as scraping and removing hair from a soaked hide.

Other wear patterns were produced experimentally, but those listed above are the most common and are most relevant for the present project. The macroscopic presence of polish alone does not always signify that a bone was used. Many processes can produce polish on

Taxon	Common name	Point		Rounded point		Blunted point		Needle		Chisel/gouge		Scraper		Plaster tool		Spatula		Spoon		Belt hook		Collar		Haft		Ornament		Pendant		Bead		Ring		Knuckleb one		Miscellaneous perforated tool		Pressure flaker		Hammer		Preform		Preform or waste		Waste		Unidentified		Probably not a tool		Total
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Medium bird																														1	5.3																				1
Hare-size (rabbit to medium dog)		1	0.6							1	11.1																	1	5.3																				3
Vulpes sp.	fox																											1	5.3																				1
Dama dama																																									1	10								1
Capra	goat	3	1.7																													1	5																4
Ovis	sheep	24	13.9	1	25					1	11.1																					16	80	1	50											2	3.7	1	12.5	46
Ovis/Capra	sheep/goat	61	35.3							1	11.1													2	66.7			3	15.8	2	40	1	5							2	20	1	25	1	50	8	14.8			82
Ovis/Capra/Capreolus	sheep/goat	18	10.4							2	22.2																			1	20											1	25							22
Sheep-size (medium dog to medium sheep)		58	33.5	1	25			10	55.6	3	33.3					1	14.3													2	40	1	5	1	50	1	100			2	20	1	25			20	37	3	37.5	104
Sus scrofa	pig																0					1	100					1	20																	1	1.9	1	12.5	4
Pig-size		1	0.6					1	5.56								0																													5	9.3	1	12.5	8
Cervus elaphus	red deer									1	11.1			1	100		0							2	100			3	60	1	5.3							1	100					1	50	3	5.6			13
Large cervid	large deer	1	0.6	2	50	4	80										0													1	5.3									1	10	1	25			5	9.3			15
Bos/Bison	cow/bison																0		1	50												1	5													2	3.7			4
Cow-size (cattle/red deer/horse)		3	1.7			1	20	7	38.9			1	100			6	85.7	1	1	50				1	33.3	1	20	11	57.9										4	40					8	14.8	2	25	47
Indeterminate		3	1.7														0																													3	
																	0																															
		173	100	4	100	5	100	18	100	9	100	1	100	1	100	7	100	1	2	100	1	100	2	100	3	100	5	100	19	100	5	100	20	100	2	100	1	100	1	100	10	100	4	100	2	100	54	100	8	100	358

Table 3. Bone artefacts by taxa.

	Artifact type																																																
Element	Point		Rounded point		Blunted point		Needle		Chisel/gouge		Scraper		Plaster tool		Pressure flaker		Spatula		Bead		Belt hook		Collar		Haft		Hammer		Knucklebone		Miscellaneous perforated tool		Ornament		Pendant		Preform		Preform or waste		Ring		Spoon		Unidentified		Waste		Total
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	n	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Tooth																			1	5.3			1	100									1	33.3	3	60									3	5.6			8
Antler	1	0.6	2	50	4	80			1	11.1									1	5.3					2	100	1	100							1	20	2	20	1	25					7	13			23
Thoracic vertebra																																														2	3.7			2
Rib	3	1.7					17	94.4			1	100			1	100	5	71.4															1	50					3	30							17	31.5			52
Scapula																	1	14.3																													3	5.6			4
Radius	2	1.2																																															3
Ulna	1	0.6																															1	33.3															2
Femur																																									3	60					2	3.7			5
Tibia	10	5.8							4	44.4									2	10.5																											4	7.4	1	100	21
Astragalus (talus, tibial tarsal)																													20	100	1	50																	21
Metapodial	94	54.3	1	25					1	11.1			1	100					2	10.5																	2	20	2	50					5	9.3			110
Second phalanx																			1	5.3																													1
Long bone	58	33.5	1	25	1	20	1	5.6	3	33.3							1	14.3	11	57.9	2	100											1	33.3	1	20	3	30	1	25	2	40	1	100	13	24.1			101
Indeterminate	4	2.3																	1	5.3																													5
Totals	173	100	4	100	5	100	18	100	9	100	1	100	1	100	1	100	7	100	19	100	2	100	1	100	2	100	1	100	20	100	2	100	3	100	5	100	10	100	4	100	5	100	1	100	56	104	1	100	358

Table 4. Bone artefacts by element.

bone; carnivore chewing, the effects of wind or water, tool use, or over-zealous cleaning post-excavation. Weathering causes bone to exfoliate and use wear can be altered or lost. Caliche deposited on the surface interferes with the ability to observe use wear, and is very difficult to remove without damaging the wear. Trampling, dog chewing, and other processes can cause bones to become fragmentary.

Types of bone artefacts
Bone artefacts were divided into standard types described in early publications (Russell 2005), including utilitarian and non-utilitarian objects. In all, the collection includes tools or other bone artefacts representing most stages of the artefact's life history, including procurement, manufacture, use, reuse, and discard (Table 3: Tool types). Most were made from artiodactyl long bones, followed by ribs, teeth, and astragali (Table 3, 4). A few objects were made from other elements.

Pointed tools
Pointed tools are subdivided into points, rounded points, blunt points, and needles. Together, pointed tools make up the bulk of the modified bone assemblage, and points contribute the greatest portion to the pointed tools.

Points
Figure 66 shows general uses of 135 points as determined by microwear. Equal proportions of tools have wear suggesting contact with soft materials as silica-rich plants or similar hard materials. Other tools received multiple uses. Within these larger categories are a few interesting tools with unique wear patterns. At least one point, 17214.X2, has wear very like awls used to produce wicker baskets with one side covered with transverse and diagonal striations visible under 50-60X magnification. Some of these striations cluster in low parts of the bone surface, as are those formed by pressing basket warps into place with the side of a tool. These striations appear to have been made through contact with a hard, abrasive material like plant fibers. The tool shaft was not twisted in plants, striations are found only on one side. The side opposite these transverse striations and their abraded flat surface is covered with polish and a more rounded wear. This could have formed through heavy hand wear, or be a sign of multiple use, but this cannot be determined. This piece, recovered from West Mound Trench 5, was assigned to Chalcolithic times.

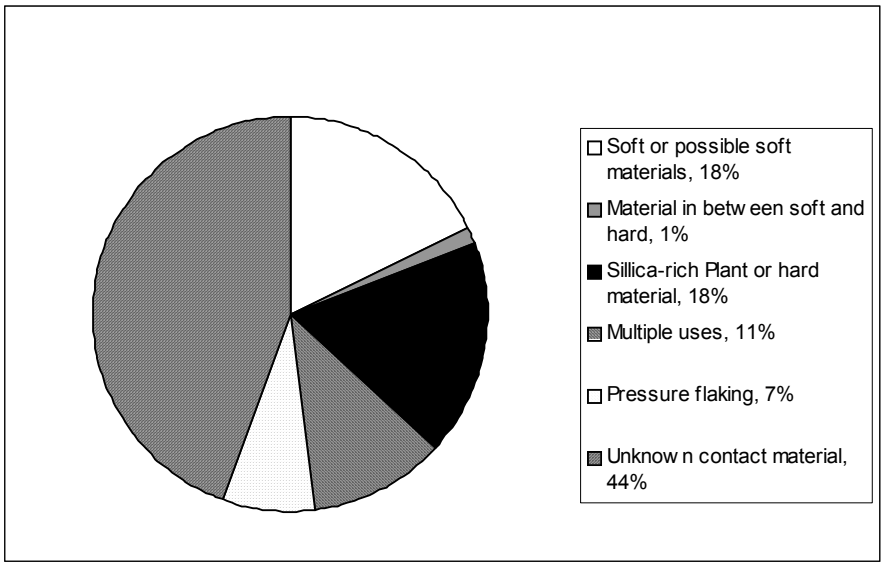

Figure 66 Point uses (n=135)

Tools contacted plants or hard materials that were likely plants in longitudinal, diagonal, transverse, and complex motions. Of the 15 tools with transverse striations, five had striations extending around the tool tip, indicating twisting, rather than side-to-side motions. These tools are most likely to be some kinds basketry tools. One, 12526.X1, was inserted fairly deeply

(1.5 to 2 cm.) into an abrasive material before twisting, but the striations on most indicate that they were more commonly inserted a shorter distance into the worked material.

Nine tools have wear consistent with pressure flaking, including a few points that appear to have had one use first, and then seem to have been used for pressure flaking before they were discarded. One point seems to have contacted fine textured plants, was resharpened, and then possibly used as a pressure flaker. Another tool also appears to have been used with silica-rich plants or hard materials before pressure flaking and a third contacted a possible soft material. Remnants of wear on another tool suggest that it received some other use before being used as a pressure flaker, but that use is unknown. These four tools are not included in the multiple use counts on Figure 66 but are listed as pressure flaking tools.

Transverse cuts circle the shaft of one point, 17609.X2. The point is made on a broken tibia shaft, scraped longitudinally, but smooth and rounded and ground. The base of the break is highly polished and rounded, and the tip heavily worked. The use wear suggests plant stripping or splitting. The broken portion is covered with a very rounded polish suggesting hand wear or other contact with soft materials. Cut marks on the shaft look as if they were added after some of the polish was formed. They could have been added for decoration, or for traction, to keep the tool from slipping in the hand.

The shaft of one long, narrow, sharp tipped, tapered point (7841.X4) is rounded and covered with very fine transverse striations. The rounded surface suggests that the tool surface contacted a soft material, and the very small size indicates a fine textured contact material, The striations are so fine that they are barely visible under 60X. These traces hint at the possibility of weaving, but higher magnifications are needed to confirm this possible interpretation. The transverse striations that cover a point or needle midsection, 17047.F668, indicate that the shaft of the tool was used in either a side-to side or twisting motion. This fragment is too fragmentary to provide more than hints of use, and the contact material is unknown, but the tool shaft received use, as is the case with both weaving and basketry tools.

About 11 percent of the pointed tools seem to have received multiple uses. Multiple use tools may have received their uses sequentially, or, different parts of the same tool may have been used. For example, the traces on one multiple use tool (14120.X26) indicates that different parts of the tool seem to have had different uses. Fine transverse sharp-edged striations circle the tip suggesting twisting in silica-rich plants fibres that were more or less parallel to one another. It is polished all over and the polish is especially heavy on the shaft. This polish may be hand wear, but coarse diagonal striations are also present in a few patches of the shaft.

The uses of 61 points could not be identified to contact material, but in some cases, information could still be obtained (Figure 67). For example, several were used with materials that were too fine textured to identify at 50 to 60X. Others were very lightly used, and some a few were so heavily used that the contact materials could not be identified. Seven of the 13 tools with transverse striations were used in twisting motions,

Blunt points

Five tools were classified as blunt points. Of these five, four are made from split antlers. One, 17914.X1, from Building 49, 4040 Area, is wide, heavy, and almost spatulate, rounded at both ends with two notches cut into one side. Few manufacturing traces remain on this piece aside from marks suggesting it could have been shaped by slicing, and the use cannot be determined. Another split antler, 16488.F62 (Building 77, 4040 Area), was shaped to a thick, short blunt point. It is drilled straight through at one end, but is very eroded with little surface remaining. Little information can be obtained concerning manufacture and use. Another, 15847.X7, is the broken tip of a blunt point recovered from a midden from the TP Area. It was cut to shape using large slicing or chopping motions. As with much of the antler from at Çatalhöyük, the surface is deteriorated. Some patches of bright polish remain on high points, but the distribution is likely related to preservation rather than where the wear was actually formed, and it is not possible to interpret the use.

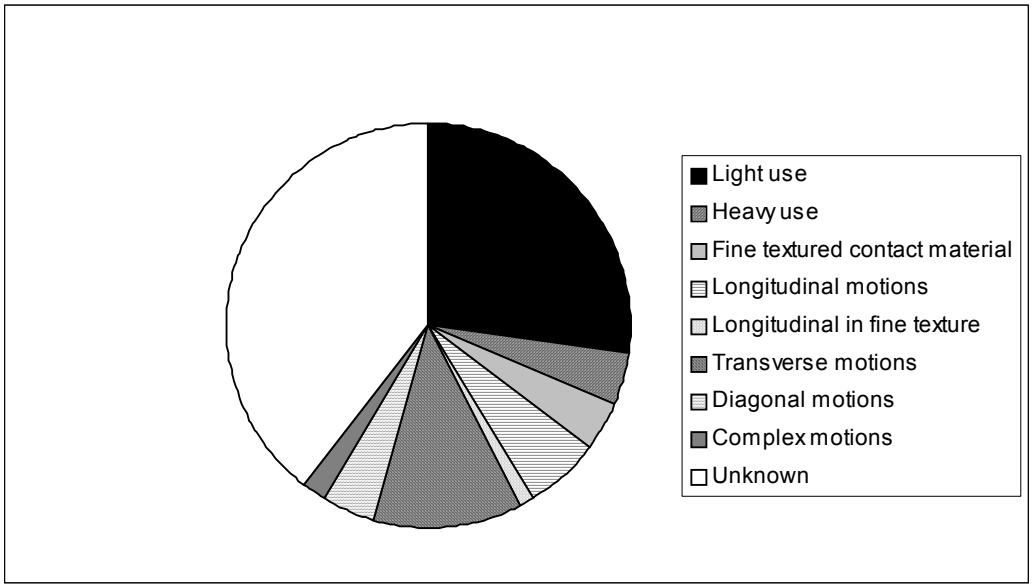

Figure 67 Point Uses: Unknown contact material (n=60)

The fourth antler tool, 13440.X1, is another heavy piece. The tip was ground into a facetted, slightly triangular point. It is broken, but the shaft seems to taper towards the broken end and this piece, too, may have been bi-pointed. Two shallow notches were cut on the edges opposite one another about 3 to 4 cm from the tip. No polish is visible within these cuts up to 60X. The entire tool, or what remains of it, is polished, with longitudinal striations. If this piece was deliberately polished, it was probably polished before the notches were cut. The lack of wear inside the notches suggests that if the notches were used to secure the antler to another component, there apparently was little movement of the tool in its bindings.

The single bone tool in this category, 16308.X2, is complete, short, highly polished, and stained with blue-green pigment. One end has a blunt point, the other is carved. It was ground all over except in the carved areas. This piece is covered with bright polish. Under magnification, the polish looks like that produced by contact with soft materials, and the extent and evenness of the polish suggests that it could have been deliberately polished using soft materials. One end is carved to be more or less round, slightly flat, with two lines on the front and back of each side. It is slightly waisted near the carved, bulbous end. This piece was found in a burial in a pigment concentration (F. 3010, burial, 4040 Area) and perhaps served as an applicator.

Rounded points

Rounded points are points with rounded ends (Russell 2005). Four rounded points were examined in this study, two made from large cervid antler and two from bone. The antler pieces are deteriorated and it was not possible to identify possible uses.

One long, bipointed tool, 15839.X33 (TP Area, burial infill), was shaped by cutting a wide shallow notch on each side approximately in the middle, connected by a groove on the cancellous side, by an indentation or a shallow groove on the cortical side, perhaps for hafting. There is polish on both ends, but the use is unknown.

A second antler tool, 13167.F4 (4040 Area, midden/pit fill), indicates that it was probably removed from the main antler using the groove-and-splinter technique, that is, by incising parallel grooves into the antler using a flake, knife, burin, or similar tool. When the grooves are deep enough, the splinter is pried out, producing a wedge-shaped cross-section. One side was additionally shaped by grinding or scraping. The end has several facets that were likely made by grinding but no manufacturing marks no remain. The shaft is broken.

The last tool is a split metapodial 16469.F120 (4040 Area, Building 77). The condyle is relatively untouched after splitting. Tool edges are ground, but no other traces of manufacture

or use were seen. This piece may be an unused or little-used point, but it could also be the base of another tool.

One sheep metacarpal, 14120.X2, recovered from a midden in the 4040 Area is long, slender, parallel-sided, with a slightly faceted tip. Light to medium polish can be seen with no magnification. The tip and shaft were ground, and most grinding marks are rounded and polished. Polish and striations at the tip suggest contact with soft material. Similar wear is present on the shaft, but is clearest at the tip. The presence of similar wear on the shaft could indicate that the object may have been deliberately polished. Use striations were not clear at 60X. Unfortunately, although antler seems to be an important raw material for blunt and rounded points, the poor preservation prevents use wear analysis. The three bone blunt and rounded points all received different uses.

Needles

Needles are perforated tools. Most of the tools examined here were flat, wide tools, perforated at one end. Eighteen needles were examined in this study (Table 3, Figure 68). All but one of the needles were made from cow-sized or sheep-sized mammal bone. All but one were made from ribs. One needle was made from a pig-sized mammal rib, and one from long bone of a sheep-sized mammal. Tool-makers used several methods to perforate their needles. Three were drilled from one side using a flake or other tool that expanded from the tip, producing a cone shape on one side. Four were biconically drilled, that is, they were drilled from both sides. One was drilled with a narrow, straight-sided implement that did not leave a cone. Four were slotted. These were made by cutting longitudinal grooves into the piece. Four more were grooved, and then the groove was expanded into a hole. One tool midsection retained a groove, suggesting it was likely a needle, and the method of perforating another needle fragment could not be determined.

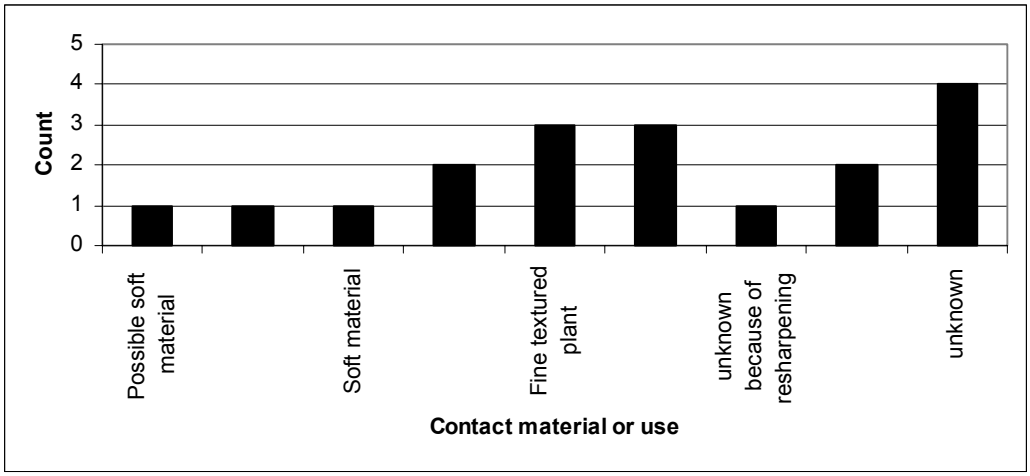

Figure 68. Needle uses (n=18)

Although manufacturing marks differ between the pieces, there do seem to be some commonalities in use. Many of the needles appear to have contacted fine textured abrasive materials in longitudinal, transverse, or longitudinal and transverse motions. Only one, 14106.X2, from a midden in the 4040 Area has a rounded surface strongly suggesting contact with soft materials. Eight were used with fine textured materials, five of those eight with either plants or hard materials that were likely silica-rich plants but lacked diagnostic traces.

Two needles were found in Unit 16590 (South Area, midden). One, 16590.F455, was only lightly used. The surface is covered with long, longitudinal striations indicating that it was likely drawn through some unknown material. The second is one of the tools with wear inconsistent with the majority of the tools. This anomalous, and unidentifiable wear has some similarities with tools that contacted soft materials, though is not identical to any, but, the osteons are also outlined, as described by LeMoine (1991) suggesting that the materials could have been wet. This wear pattern could not be identified at 60X magnification. The uses of three were entirely unknown.

Taken together, these tools suggest some kind of manufacturing using fine textured fibers. Coiled basketry remains have been found at Çatalhöyük, as have impressions of twill plaited matting (Wendrich 2005), and some of the needles as well as the points could easily have been used to make such objects. Many of the needles seem to have moved longitudinally through fine textured plants or plant fibers, but they also moved side to side and diagonally. Most of the needles are too large to have been useful for fine coiled basketry, but the flat shape would potentially have been useful for mat making, or similar products. Baskets, mats, sandals, and other necessities can all be woven using needles and silica-rich plant fibers, and weavers also use needles to produce softer textiles of linen and other materials. Linen and bast cloth has also been recovered, but it is not known whether linen fibers can create the sharp-edged striations seen on these tools.

Perforated tools

Two other perforated tool fragments were recovered, but the original tool form cannot be determined. One, 14120.X3, was made on a sheep-sized mammal rib. It was ground all over, perforated by cutting a groove partway through the bone on one side and then expanding the hole in the centre of the groove, perhaps by twisting a flake or other flat tool to produce a slightly squared hole. It is polished all over, and the polish and rounding are heaviest toward the broken end. The wear is similar to that found on tools used to work soft materials, but it is not possible under these magnifications to identify if it was intentionally polished using leather or if the rounding came about through use. The second tool (17653.X3) is made from a sheep astragalus and has light to moderate flattening on one side, with none on the other. It is burned, and in some areas it appears that the surface reflectivity was influenced by that burning, but it appears that the tool has at least a light polish. The use is unknown.

Chisels/gouges

Nine chisel/gouges were examined in this study. Most were made from long bones of sheep, sheep/goat, sheep/goat/capreolus, or sheep-sized mammals, though one was a red deer antler, an one a long bone of a hare-sized mammal. As with the chisel/gouges described earlier (Russell 2005), many were made from tibiae. All have a bevelled end.

Use wear analysis largely supports the interpretation of these tools as chisels or gouges. Four have wear consistent with experimental wood working. Two more have wear indicating contact with a material in between soft and hard in longitudinal striations. These, too, could be wood, but diagnostic traces were not visible at 60X.

Another tool, 12834.F1, from Building 56 in the South Area has wear suggesting contact with a hard material somewhat different from the others, the end is battered, but striations are very fine. It does not appear to have received use as a pressure flaker. It could have been used to contact wood, as well, but a harder material. 17225.X2, from West Mound, Trench 5, was very heavily used, but the exact use cannot be determined at these levels of magnification. Two of the chisel/gouges were resharpened, one was used after resharpening, but the other was not used heavily afterwards and the remaining traces surrounding the resharpening cannot be identified as to use.

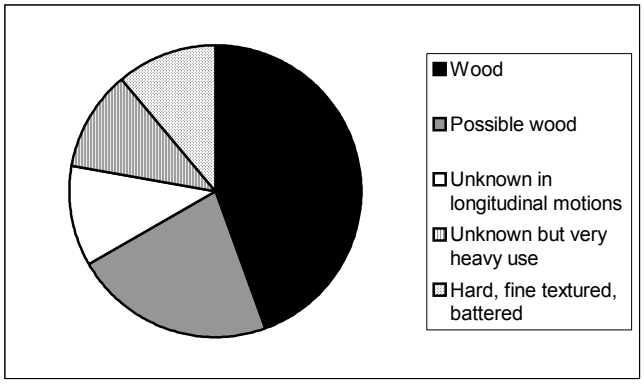

Figure 69. Chisel/gouge uses, n=9

Spatulas
Seven spatulas were examined. Three fragmentary tools were found together in Unit 16498, Building 77 in Area 4040. Of these, 16498.F14 and 16498.F17 have similar wear. Both are burned black, with coarse textured striations running across the edges suggesting that the edges of both moved across some coarse textured hard material. A third tool, 16498.F15, was also burned black. The surface appears distorted by burning, but a few patches of striations remain showing that some hard material was likely drawn across the edge. The striations are coarse, but slightly smaller, suggesting a finer texture than those on the other two tools. The contact material is tentative because of the burning, but more likely to be a hard material than a soft material. 17672.X1, a split rib was shaped into a round spatulate slightly battered end. Most manufacturing marks have been erased by later work or use. Light polish covers the entire tool, and the wear is similar to that found on tool handles. The last use left non-patterned striations in the light polish, but the use is unknown.

One complete notched or toothed spatulate tool, 17905.F612, was recovered from Area 4040 in the occupational debris of Building 49. It is curved at one end, more-or-less flat at the other. Twelve notches were incised into one edge, eight on the other, and six on the curved end. The unnotched end is slightly battered and polished, perhaps from hafting. The flat end is slightly battered, and under magnification one face has a shallow transverse cut mark, perhaps acting as a stop for the chipping/flaking. There is polish on top of some of the chips. It may be that the tool was thinned for some kind of hafting. At the other end of the tool on the curved end, striations suggest movement of some fine textured material across the edge. The tops of the teeth are more rounded than the bottom and sides of the notches, suggesting that the material did not usually run all the way through the notches, and the wear is heavier at the small end of the tool than on the sides. The use striations are individual, not in groups of parallel fibres as is found with some kinds of plant processing, but the contact material is not identifiable at 60X.

A long bone of a sheep-sized mammal was shaped into 16896.F846, a spatulate bevelled tool with a broad end. The end was chipped and smoothed over. The edges and the cancellous side are ground, the end chipped and battered. The wear on the bevelled end looks most like it contacted a medium-textured material such as soft wood, hard leather, or rawhide with longitudinal striations running across the edge, but these materials seem unlikely because the bevel itself is too round to work as a chisel, though perhaps could be used as a wood working wedge. Heavy wear on the shaft could be hand wear. Another split rib tool, 15717.F5, was ground around the edges and on the cancellous bone side but the tool use is unknown due to poor preservation.

Unlike chisel/gouges, spatulas do not seem to have a single, common use. Three tools found together do seem to have had similar uses, but the tools found elsewhere have different patterns.

Scraper
One tool, 15597.X1, was identified as a scraper based on its shape. It is a split rib, wide, very thin, with one end worked to a wide curve. The edges are ground down, smooth and rounded. The cortical side is ground smooth, with striations running in many directions. The traces are more difficult to see on the cortical side, but appear to be similar. The surface is polished. The edges appear to have contacted some very hard material at the edge, perhaps pottery.

Hammer
One antler hammer was identified. This piece, 17525.X1, is heavily worked and was made from an antler base and partially burned. It is shaped into a hook, blunt pointed at one end, rounded at the other with wide finger-sized grooves cut into the side. The end is battered, but the exact material it contacted is unknown. Hammers are described in detail in Russell (2005), and this discussion need not be repeated here.

Plaster tool
A single possible plaster tool was examined. This tool, 13365.X32 from the South Area, was broken midshaft with bright polish and transverse striations on the shaft. Striations indicate that the shaft contacted some coarse, hard material, leaving sharp-edged striations that are

clear at 40X. This wear is similar to that found on experimental fine tempered pottery. No plaster work was conducted in the present experimental program and I do not know if smoothing plaster could produce similar patterns.

Hafts

Two hafts were made from antler tines, both from the TP Area. One, 15839.X35, recovered from burial infill was roughly chopped or sliced to shape and then drilled on both ends, with a maximum diameter of 11 mm perforation. The drilled holes do not meet, and the opening on one end is smaller than the other, perhaps to fit two sizes of tools. The ends are ground down, and the entire piece is smoothed and covered with light polish. The second haft, 16896.F793, was cut using the cut and snap method. The other end was cut, leaving a few facets, and the end was ground flat. One side was flattened, and at least five shallow, wide cuts. The cancellous bone was removed.

A Chalcolithic-age antler object assigned to the Preform or Waste category may also be a haft preform. This piece, 16898.X16, was found in the room fill of Building 310 West Mound-Trench 5, and is an antler cylinder, incised with three grooves. The central groove is very thin, made with a narrow blade. The cancellous bone was partially gouged out at the ends with a tool that left roughly triangular marks. The body is lightly polished.

Unidentified

Tools placed in the unidentified tool category represent a variety of tools, activities, or manufacturing stages. Some may be shaft or handles of broken tools, some may be fragments of broken ornaments or preforms. Use wear was present on some fragments. For example, sharp-edged small and large striations indicate that both coarse and fine fibres were drawn across the edge of a tool made from a sheep-sized mammal long bone, 15261.F469. A rib fragment, 17513.F7 could be a pottery polisher, but it was burned, and the surface may be distorted. A split proximal metapodial splinter, 17697.X7, has no obvious manufacturing traces but the end is battered. In addition to the battering, the end has transverse motions indicating a side-to-side motion, with large individual striations suggesting contact with hard, irregularly grains. One small fragment, 15226.F344, is covered with polish that strongly resembles that produced by working with silica-rich plants, but the object is too fragmentary to identify the tool use.

Other unidentified objects include 16262.F3051, a cut and ground boar's tusk. One forked object, 16262.F3054, was broken at both ends but originally had at least three tines. It is made on a split rib and covered with light polish, and the broken edge of the middle tine is polished and slightly rounded. Use wear analysis was unproductive on this tool.

Three scapula tools are intriguing but unidentifiable as to contact material. Both ridges were removed from one scapula tool, 17079.F25. The ridges removed by breaking, and scratches by the breaks suggest that a chisel may have been used to help remove off the ridges. Light grinding smoothes broken area. but no use wear was present aside from occasional patches of light polish. Two scapula blade tools may have had similar functions to one another. The ends of both were shaped into was shaped into a curved, bevelled blade. The bevelled end of one, 16408.F24, is very smooth and very flat, with a few randomly oriented striations still visible at 40X suggesting that it was used in irregular motions. The striations are finer than those on the second bevelled-edge scapula tool, 14471.F14. The edge of this tool retains grinding marks, and polish on the sharpened edge includes a few large striations suggesting that it was used with a material that was slightly grainy. It was not possible to identify the uses of any of these three tools.

Several split ribs were placed in this category. Several ribs have traces splitting by breaking. Experiments show that bison ribs (and likely red deer or other large artiodactyl ribs) can be split using a hammerstone and anvil. Fresh ribs can be split by knocking the two ends off and peeling away the periostium, placing the rib on an anvil, tapping along the edge of the rib with hammerstone, turning the rib over, and repeating the process along the opposite edge. Eventually, the rib can be split by pulling it apart with one's fingers (Griffitts 2006). This process leaves a crushed edge, with some flaking, or impact cones. The ragged cancellous bone within can be easily smoothed using a stone scraper or other tool, and the piece is then

ready to be shaped into a tool or ornament. Two unidentified tools, 13167.F2 and 7058.F657, seem to have been split in the way. The uses of both are unknown. But, other ribs were split using other methods. Another unidentified tool, 14019.F2 was split by cutting with some tool that left very clean, sharp-edged cut marks.

Waste
Waste materials add information to the data gained from interpreting manufacturing traces. Two pieces were identified. One distal metapodial was hacked or chopped around the circumference, and then snapped. It appears to be waste from making another object. A second piece, cut from a sheep/goat tibia using groove and splinter.

Other bone artefacts
The study focuses heavily on use wear, and therefore on tools rather than ornaments, but many other objects were present other than those described in detail above.

Rings
I examined five ring fragments in this study, all from area 4040. Three were made from sheep/goat or sheep/goat/roe deer femora, the others from long bones of sheep-sized mammals. All were made by cutting thin sections of long bones into a narrow ring, grinding the cut edges smooth, and then polishing the piece. In all five examples, the cut marks are smoothed by grinding and rounded by polish, and in most cases, the cut marks were entirely erased by later work, and the grinding marks are also reduced by later work. All were polished on inside and outside. The surface of one (17477.X1) is a bit scratched and does not look freshly made and polished. Perhaps this ring was received more use than others. For of the rings were recovered from 4040G phase contexts, the fifth was from possible 4040 G phase. Two in middens, one from burial fill, platform fill, and feature fill.

Beads
The form and manufacturing techniques largely correspond with the beads varieties described in earlier Çatalhöyük studies (Russell 2005) and need not be repeated here. Of the nineteen beads, seven were tubes. All tubular beads were made from long bones, including one metapodial each of fox (13188.X2), a hare-sized mammal (13352.H1), two sheep/goat tibia (13532.X42, 17804.X20), a long bone of a medium-sized bird (15909.F1), and two from cow-sized mammal long bones (15712.F8, 17017.F827).

The single triangular bead was made from a sheep/goat phalanx. The bead, 14106.F33, is rounded and polished, biconically drilled at one end, and broken through perforation. One of the broken edges is very rounded. A round bead was cut from antler. The perforation on this bead was drilled from one side in the approximate centre using a straight-sided tool. There is a little chipping on one side around the mouth of the perforation. The edges are gently bevelled and rounded. A second round or oval cut bead (0.F14) was made from bone and drilled off centre from one side. Light polish and rounding is present on all edges, both faces, and the edges of the perforation. Some light polish can be seen inside the perforation, but no string wear is visible at 60X.

One red deer canine and seven imitation canines were present. The red deer canine (16590.F14) was broken through the perforation and reworked, both times with more or less straight-sided implements. It was polished all over, and the break was repaired by smoothing and rounding the broken edges producing a roughly heart-shaped piece. The canines, both real and fake, were examined under magnification to try to identify string wear or other microscopic traces. The inside of the perforation on 14120.X17 is polished, perhaps by running a thong or cord back and forth. The piece was broken through the perforation and the top part missing, and so the polish is unlikely to be the result of string wear, unless it was strung on a very thick cord. Other fake canines were polished inside the perforation. In some cases the perforation edges are still sharp, though lightly polished (14120.X18), and in at least one example (14121.X4) the piece was drilled after polishing. Two of the remaining fake canines (17042.F1, 17080.F25) were drilled straight through. One of these was eroded, the other heavily polished, and little else can be determined about either. The remaining piece was polished and biconically drilled (17088.X5).

Pendants
Five pendants were examined. Of these, two were red deer canines and one was fake red deer canines. The actual red deer canine (17901.F1) was drilled, polished, broken, and then repaired by drilling a second time. Both times the drilling was accomplished using a straight-sided tool, though very small rounded cones on each side of the unbroken perforation indicate that it was in fact biconically drilled. Another red deer canine (16498.F4) was also drilled straight through, burned black and shiny, broken, and not repaired after breaking. This piece looks like it was drilled, and then the perforation ground down on both sides, perhaps using string and sand, leaving sharp grinding striations going in and out of the hole. One fake red deer canine (16590.F15) was made from a long bone of a cow-sized mammal. This piece was broken through the perforation and drilled with a single cone. A pig tooth, 16590.F15, was drilled twice, broken, reworked, and polished. The remaining pendant was made from a red deer antler and is similar to the pendant/bull roarers described in earlier seasons (Russell 2005). The edges are roughly cut to shape with overlapping diagonal cut marks remaining and it was drilled straight through with a straight sided implement. It is deteriorated, and it is difficult to see manufacturing marks or traces of use.

Ornaments
Three other ornaments were also recovered. One sheep/goat ulna, 13188.X8, was carved into a long, narrow object with a seven "V"-shaped notches forming six spikes around the margin of one end forming a star, flower, sun, or other pattern. An eighth cut on one side may mark the beginnings of a seventh spike that was never completed. It is likely ornamental, but is not as highly polished as some of the points and other utilitarian tools. There is a very light patchy polish along the high points of the shaft. The nature of the polish cannot be identified, it could be intentional and decorative or smoothing polish or could have been acquired through use, if this object were a tool of some kind rather than strictly an ornament.

A highly polished long, narrow, pointed object was made from a sheep/goat tooth (12456.F629). Diagonal grinding shapes the edges, tip, producing a narrow, thin object with a flat, blunt point. These grinding striations are well rounded over. Those on the enamel are less clear, but also largely diagonal. It is smooth, rounded, and bright polish all over. Wider end is snapped, probably modern.

A hairpin or other ornament was made from a long bone of a cow-sized mammal. This object, 16446.X1, is carved with a loop at the end and three transverse, parallel grooves, with red pigment remaining at the bottom of the middle groove. The loop at the end was ground, the outer edge of the loop is rounded, and the inner edge is bevelled. The polish is very light on the base and slightly stronger on the loop.

Knucklebones
Twenty knucklebones, all made from astraguli, one made from cattle or bison, one from a sheep-sized artiodactyl, one from a sheep or goat, and the rest from sheep. A few were examined under magnification. For example, polish on 17812.F60 seems to indicate contact with hard materials. It could have been polished deliberately with plants, or stored or shaken in a basket.

Knucklebones were worked to varying degrees. Some were only lightly polished (7066.F70) or slightly abraded on the highest points of one face (12456.F603, 8004.X7). Others are much more heavily worked. In some cases, one face is ground flat and then the bone was polished all over (13909.X20). More than half of the knucklebones were recovered in groups of two or more. Of the twenty pieces, four were found in (13041), and four from (7066). Two were recovered from (17812), and two from (13909). The remaining eight were found individually. The degree of shaping varies among the knucklebones found in groups. That is, just because knucklebones are found together does not guarantee that the pieces will be worked to the same degree.

Hafts and hafting
The socketed antler tools could have been used with other bone or antler tool bits, or could have held tools of other materials. Small, sharp-edge stone flakes or blades can be made more comfortable in the hand by inserting them in some kind of haft. The use-life of tools can

be extended by inserting a worn down and heavily re sharpened tool into a haft. In addition to the socketed antler hafts described above, other tools may have had handles or hafts. As noted above, the non-working edge of a notched spatulate tool was thinned, perhaps for hafting, or for some other use. Transverse cuts circling the shaft of one point could have added traction. No undisputable evidence of hafting was identified on points, but rounding on tool handles and shafts may reflect hand wear or deliberate polish.

Summary

Although use wear provided a few insights concerning manufacture or use of non-utilitarian objects, not surprisingly, it was most useful for the more utilitarian tools. A few form-function correlations were noted. Fore example, many of the chisel/gouges have very similar wear patterns, suggesting that they were all used for similar activities. Many needles, too, seem to have shared uses. On the other hand, bone points had a variety of uses. Some seem to have had single primary uses, other were multiple use tools. The inhabitants of Çatalhöyük used their bone points to work leather or hide, produce baskets, sharpen their stone tools, and for other tasks. The use wear on the some points, fragments, and needles from Çatalhöyük provides glimpses of possible weaving, but the traces are too small to be identified with any certainly at these levels of magnification.

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Catalhöyük Human Remains Archive Report 2011 - Lori D. Hager (1), Başak Boz (2), Jennifer Byrnes (3), and Sophie Moore (4)

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During the 2011 field season at Çatalhöyük, Neolithic and post Neolithic skeletons were recovered during excavations on the East and West mounds. The human remains team (Boz, Byrnes, Hager and Moore) worked in the field during the excavations, in the laboratory on the newly recovered skeletons, and on various research projects, including preparing papers for upcoming publications. Clark Larsen made a brief visit to the site to complete edits on the upcoming volumes and to discuss future plans at Çatalhöyük. The archaeological context of the newly excavated burials, Neolithic and post Neolithic, and the results of the preliminary laboratory analysis are reported here. In addition, Sophie Moore reports on her study with Mark Jackson on the burial practices of the post Neolithic skeletons from the 4040 Area.

Neolithic Burials from Catalhöyük 2011 - Lori D. Hager and Başak Boz

Excavations in the 4040 and South Areas resulted in the discovery of several graves containing the skeletons of adult and juveniles. Ten new individuals were identified in the 4040 Area, five were excavated and lifted in 2011, all from B.77. Six full or partial skeletons were recovered from B.97 in the South Area, the only house in the area yielding burials in 2011. The new skeletons were found in primary, primary disturbed, secondary, and possibly tertiary contexts. In the 4040 Area, the five excavated skeletons were from the northeast platform; four were primary disturbed skeletons, one was a secondary context skull. In the South Area, the primary interments were under the northern floors and in the eastern platform; secondary or possibly tertiary, context skeletal elements were found in the southern part of B. 77. Two skulls were found without bodies, an older female (19500) in the northeast platform of B. 77 and a middle adult male (18645) in the infill above a bin in B. 97. In the South, human bones were found mixed with animal bones in an infill context in the southeast corner of B. 97 (Sk 18635, Fill 19245).

Orientation of the body with the head to the west, the most common direction for interment at Çatalhöyük (Boz and Hager, forthcoming), was noted in the South Area for two of four primary interments. One South Area juvenile was oriented with the head to the northwest, the other was indeterminate due to disturbance in Neolithic times. In the 4040 Area, the disturbance to the burials to the north of B.77 precludes direct evidence for orientation of the bodies. However, based on the orientation of the grave cuts, which tend to be oval shaped, it is possible to infer the direction of greatest length and thus the most probable position of the main axis of the body. The southeastern grave cut (19536) for F.3619 (Sk 19501+19535) suggests the body would have been placed with its greatest length in a north-south direction. The location of the head (19501) in the south of the pit may mean the body was originally oriented to the south, the second most common burial orientation at Çatalhöyük. The cut (19542) for the northern grave pit (F.3620) in the northeast platform was oriented with its greatest length in an east-west direction. The intentional placement of the long bones of a minimum of three individuals in an east-west direction in the grave pit with one disturbed skull (19541) to the east and the other (19554) to the west strongly suggests the original grave was also oriented east-west. The cut (19536) for the disturbed skeleton (19529) found in southwest grave pit (F. 3616) did not yield any information regarding orientation of the skeleton before its disturbance.

Three primary interments from B. 97 in the South Area were found in crouched (flexed) positions, one adult on the back, and two juveniles on the right side. The majority of the

primary disturbed skeletons from B. 77 appeared bundled or intentionally placed together by element although in one instance (19529) the disturbed bones were scattered randomly in the pit. The disturbed skeletons tended to be partial skeletons suggestive of bone retrieval and/or removal of bones at the time of disturbance.

Grave associations were limited to a few individuals. One exciting find was a stone palette lying under the base of the solitary skull (19500) from B.77. A red pigment, cinnabar or red ochre, was found on the surface of the stone (see Clay and landscape studies - Chris Doherty below). Numerous shell beads (80+) were found concentrated under the arm bones lying between the two disturbed skulls (19541, 19554) in the northern grave pit (F. 3620). One strand of the same shells was found associated with the disturbed postcranial skeleton (19535) in the southeast grave pit (F.3619). Beads, shells, and one piece of obsidian were found indirectly associated with the skull (19500) or the skull (19501) in the southeastern grave pit (F.3615, Fill 19295) in the northeast platform of B.77. A single stone bead was found in the matrix of the secondary context lower limbs bones (18635) found in the South Area in B. 97. A yellow residue was found under the skull (19501) in B.77, albeit in a disturbed context.

One primary context neonate (19689) from B.97 in the South Area was enveloped in phytoliths above (19688) and below (19690). Neonates are not typically found in baskets or wrapped in matting at Çatalhöyük although infants are. The pattern of the phytoliths suggested the plant materials were bundled and tied together. Different weaves are visible in the better-preserved phytoliths from the south area of the grave.

North Area

B. 77, Space 336

In 2011, nine individuals were discovered in the upper layers of the burial pits in the northeast platform (F.6051) of B.77. Five of these individuals were excavated and lifted in 2011; four individuals remain in situ for examination in 2012 (Figure 70). In the northwest platform (F.3611), one grave cut with a slightly exposed cranial apex of a juvenile was revealed (unnumbered, not further excavated), and loose bones from the unstratified fill unit (19290) were recovered, including the burnt bones of a juvenile. Adding the four individuals found in the east platform (F.6052) of B.77 in 2010, the current MNI for B.77 is 14 individuals. Several individuals are likely to be interred in the lower layers of the northeast platform.

The northeast platform (F.6051) was the location of the elaborate cattle horn and plaster installation found in B.77 in 2008 (see M. House Archive Report 2008 & D. Eddisford this report). The impressive cattle horns emerging from the plaster pedestals were turned inward toward the northeast corner of the house, which contained the burials discovered in 2011. Wall paintings, including a new series of 12 red handprints in a line along the north wall, and many other indications of intense elaboration, characterise B.77 whose demise and ultimate collapse was caused by a fire.

The northeast platform (F.6051) had grave cuts that were sometimes distinct and other times less clearly defined, particularly in the centre of the platform where overlapping grave cuts obscure earlier cuts. The incompletely excavated northeast platform offers a complicated sequence of interment and disturbance involving several individuals. At the end of the 2011 field season, the minimum number of individuals (MNI) for the northeast platform is estimated to be nine based on the number of crania discovered. One cranium (19500) was found without any postcranial elements; the other skulls (19501,19529, 19541, 19554) lifted in 2011 were found with disturbed postcranial skeletons. All individuals recovered from this platform this season had been disturbed.

The fire that occurred in B.77 altered the bones of those individuals buried in the northeast platform in a manner commensurate with their distance from the south centre of the house which would have been emanating the greatest amount of heat. In fact, the western half of the nearly square platform took the brunt of the fire. The plastered floors of the platform had little integrity in the west and the bones in this part of the platform were blackened from having been baked. By contrast, in the eastern part of the platform, that is the area farthest away from the centre of the house, the skeletal elements were lightly baked, some barely altered.

The 2010 skeletons from the east platform (F.6052), which was closer to the fire than the northeast platform, were baked and blackened (Çatalhöyük Archive Report 2010). This pattern of the human remains baking under the floors due to the presence of a fire raging above the dead has also been found in the South Area in B.76 (n=5) (M. House, Çatalhöyük Archive Report 2009).

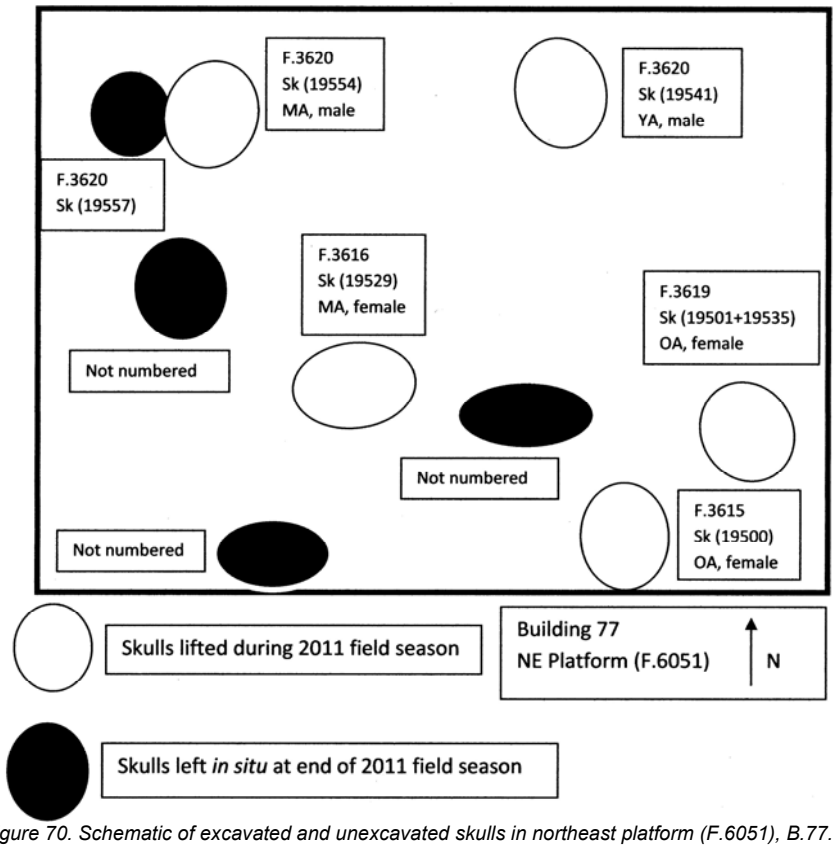

Figure 70. Schematic of excavated and unexcavated skulls in northeast platform (F.6051), B.77.

Northeast Platform (F.6051)

F. 3615 Sk (19500) Cut (19251), Fill (19512, 19295=19525) (upper fill with loose bones (19281))

A blackened skull and a few upper cervical vertebrae of an older adult female (19500) were found in the southeast area of the northeast platform. The presence of the upper cervical vertebrae (C1-C5), the hyoid and styloid processes suggests that the severance of the head from the body occurred at the mid neck region. The skull was on its base with the back of the skull atop a stone palette 19295.x8 covered with red pigment, possibly cinnabar.

Figure 71. *Two skulls of older females, F. 3615, Sk (19500) (foreground) and F. 3619, Sk (19501) (background) in the northeast platform (F.6051) of B.77, view northeast. Note red paint on the surrounding walls.*Photo Jason Quinlan

Sk (19500) is one of two skulls in the grave cut at approximately the same level (Figure 71). Sk (19500) was baked significantly more than the other skull (19501) which also had postcranial elements (Sk 19535) associated with it. The superior aspect of the skull (19500) was more blackened than the inferior aspect of the skull. A sample 19500.s1 was taken of the carbonized material, possibly brain tissue, that was found within the brain case of Sk (19500) (Figure 72). The presence of carbonized flesh in the skull suggests the head was placed into the grave pit when some flesh, minimally the brain, was still present.

Disarticulated postcranial bones, also blackened and baked, were found scattered throughout the fill (19295, 19525). These bones may have belonged to skull (19500), or individual (19501+19535), or they may represent tertiary bones from the grave fill. The cranial vault bones of the skull (19500) were thickened but without expanded diploë. The sagittal suture is fully closed endocranially and ectocranially. The teeth exhibited high dental attrition. DJD was noted on the bodies and articulating facets of the cervical vertebrae.

Figure 72 Carbonized material, possibly brain tissue, found within the brain case of Sk (19500), view south. Photo Jason Quinlan

F.3619 Sk (19501+19535), Cut (19536), Fill (19512, 19534)

The skull (19501) and disturbed postcranial elements (19535) found in the southeast area of the NE platform were initially thought to be two different individuals. Later we determined that the head and postcranial elements likely belonged to the same person, an older adult female, whose bones had been disturbed. The skull (19501) was found directly above the distal femur and other postcranial elements within the grave cut (19536) (Figure 73). The postcranium (19535) was partially articulated at the hip but otherwise the bones were not in articulation although they were not scattered but rather placed together.

Figure 73. Disturbed postcranial elements, F.3619 Sk (19535) in the northeast platform of B. 77, view north. Photo Jason Quinlan

The skull (19501) was likely disturbed when the grave cut (19521) was made for the interment of the solitary skull (19500), the last individual to be interred in the northeast platform. The postcranial skeleton (19535) may have been disturbed when the grave cut (19536) was made earlier, possibly for individuals interred below it. The skull (19501) could have been disturbed at this time also. Excavations in 2012 may clarify this issue. Not all bony elements of Sk (19501 +19535) were recovered, suggesting bone retrieval at the time of its disturbance. The postcranial elements were in poor condition.

This skull (19501) was not as thoroughly baked when compared to skull (19500), which was found at the same level to the west. Two explanations are considered. First, it seems likely that the skull (19501) was fully defleshed before the fire and before the more fleshed (19500) was

interred. The level of disturbance of Sk (19501+19535) and the subsequent rearrangement of the bones suggests full decomposition had occurred. In addition, as discussed earlier, the eastern portion of the NE platform was less impacted by the fire in the building than the western portion so that even if the brain was present at the time of the fire, the lack of carbonised brain tissue with Sk (19501) also may be a consequence of its location in the east.

Age and sex determinations suggesting the individual (19501+19535) was an older female are based on characteristics of the cranium and on the right pubis bone. The cranial vault bones were thickened with expanded diploë and there is porosity of the occipital bone suggesting nonspecific anemia and/or scurvy. The mastoid is short and slightly thickened. One of the occipital condyles shows eburnation of the articular surface. The bones are lightweight, possibly due to osteoporosis.

Above the two skulls (19500, 19501), several blackened postcranial elements were scattered in the upper part of the grave pit fill (19281). These may belong to Sk (19501) or to Sk (19500), or they may represent tertiary bones in the grave fill. In addition, a patch of yellow residue 19534.s3 was found directly under the skull (19501). Seven shells were located together 19534.x1 under the left hip of Sk (19535), probably once on a string or cord. Numerous shells (80+) of the same species were found in the burial pit (F.3620) in the northern part of the northeast platform.

F.3616 Sk (19529), Cut (19521), Fill (19526, 19533)
The incomplete, disturbed remains of a middle adult female (19529) were found scattered in the burial pit (F.3616) located in the southwest part of the northeast platform (Figure 74). Disturbance to the skeleton likely occurred at the time of the interment of the skeletons under it; three crania are visible. The fragmented skull was located in the approximate centre of the pit, lying on its left side. The mandible and several postcranial elements (vertebrae, scapula, hand, right femur and tibia, foot) were displaced and scattered in the pit. All of the skeletal elements were blackened as a result of the intensity of the fire burning above this part of the platform.


Figure 74. Disturbed burial, F. 3616 Sk (19529) in the northeast platform of B.77, view north. Photo Jason Quinlan


Figure 75. Disturbed skulls, F. 3620 Sk (19541) (right) and Sk (19554) (left) with postcranial elements placed in layers between them in the northeast platform of B.77. Unexcavated skull (19557) is present in the northwest corner, view north. Photo Jason Quinlan


Figure 76. F. 3620, close-up of arms bones stacked in layers with shells in situ, view south. Note white plaster layer under the bones. Photo Jason Quinlan

Preliminary analysis of the bones indicates the presence of reactive bone on the right mandible and an abnormal left TMJ, possibly the result of a dislocation. Nonspecific anemia or scurvy is suggested by the porosity of the occipital and expanded diploë of the cranial vault bones. The mastoids are asymmetrical (right is narrow and pointed; left is short and thick). The teeth exhibit high dental attrition. Some vertebrae were recovered, including C1. Lower limb bones (right femur and tibia, foot bones) were not in articulation.

Three unnumbered skulls (see Figure 70) and other post cranial elements found in the vicinity of the skull (19529) remain in situ for excavation in 2012.

F.3620 Sk (19541), Sk (19554), Sk (19557), Cut (19542), Fill (19540)
Two skulls (19541 and 19554) and postcranial elements representing a minimum of three adults were found in the north grave cut (19542) in the northeast platform (Figure 75). The arm and leg bones of three adults (19541), (19554), unnumbered) were placed between the two skulls,

stacked in layers, running parallel to each other in an east-west orientation (Figure 76). The bones were carefully arranged with the long bones to the north, legs and feet above the arms and hands; one skull to the west (19554) and the other to the east (19541) and the feet, ribs and vertebrae concentrated to the south and southeast. An articulated torso was present under all of the long bones. The torso looked to belong to Sk (19554). A concentration of charcoal was found in the neck and shoulder region of Sk (19554).

All of these bones overlaid a layer of grey white plaster, which served as the basal boundary of these disturbed elements. The layout of the bones resembled other primary disturbed contexts at Çatalhöyük where multiple interments occur in one location, and with subsequent interments, the bones of the earlier burials were rearranged carefully into the grave pit. On the other hand, it is possible that the skulls and postcranial elements represent a secondary deposit where the bones were brought from elsewhere after decomposition and arranged in place on top of the plaster in this grave pit. The layer of plaster under the stacked bones suggests an intentional separation of the individuals above it and those potentially below it.

A skull of a possible juvenile (19557) was identified to the west under Sk (19554) but time limitations did not allow for its excavation in 2011. The relationship of the unexcavated skull (19557) to the adult skulls (19541, 19554) and postcranial bones is yet to be determined.

Sk (19541)
The skull of a young adult male (19541) was found in the northern burial pit (F.3620), likely in a primary disturbed context. The skull was in the east of the pit with many postcranial bones stacked between it and the other skull (19554) in the west of the pit. Skull (19541) was clearly displaced, with the skull lying on the apex of the head with the maxilla up. Attribution of any specific postcranial elements to the skull was not possible in the field. All of the bones were in poor condition and many had been baked. The teeth of skull (19541) were similarly fire altered by the baking which occurred due to the fire in B. 77 such that all of the teeth broke at the same spot at the CEJ upon exposure. The supraorbital ridges are well developed on the young adult male skull (19541) and the mastoids are large and pointed. The cranial vault bones are not thickened and do not have increased porosity.

Sk (19554)
The skull of a middle adult male was found in the west of the northern grave pit (F.3620) in a primary disturbed context with several postcranial bones carefully placed between it and the other skull (19541) in the east of the pit. Presumably some of these postcranial elements belonged to Sk (19554) and some belonged to Sk (19541). A torso (ribs and vertebrae in poor condition) was in articulation at the bottom of pit, likely belonging to Sk (19554). Cervical vertebrae (C1 and C2) and the hyoid bone, presumably of Sk (19554), were recovered at lifting. The torso, the stacked bones and the skulls were above the layer of plaster previously described. The skull was on its right side, facing south. The torso and the head were oriented with the apex of the head to the west. Expanded diploë of the cranial vault bones characterizes the skull.

Sk (19557)
The slightly exposed skull of another individual, probably a juvenile, was recorded as part of F. 3620 although the skull was not excavated and remains in situ at the end of the 2011 field season. This skull was found in the west part of the northern burial pit in the northeast platform under Sk (19554). The relationship of Sk (19557) to the two skulls (19541, 19554) and the disarticulated postcranial bones found in the burial pit is unclear. Further excavation in 2012 should resolve these questions of association.

Northwest Platform (F.3611)
One grave cut of a juvenile was located in the northwest platform (F.3611) of B. 77 along the north wall. Unnumbered, this skull was not excavated and will be further explored in 2012.

Several blackened bones were recovered from the unstratified soils (19290) recovered from an animal burrow in the southeastern quadrant of the northwest platform. These included the remains of a child: cranial fragments (sphenoid and temporal), mandible with teeth (I2 unerupted crown; M1, dm2), and unfused vertebral bodies and neural arches. Age is

estimated at 6 (+/- 2) years old at the time of its death. We suspect the articulated skeleton of the child remains in situ in the unexcavated platform.

South Area
Building 97 yielded the only burials recovered from the South Area during the 2011 field season. Adults and juveniles were found in primary and secondary contexts. No grave goods were found with these individuals although phytoliths from matting or a lidded basket were found above and below a neonate (19689).

B. 97, Space 365
Central Area
Sequence of burial events in central area of B. 97 (earliest to latest):
F.3540, (Sk 19670): was disturbed by interment of Sk (19635)
F.3534, Sk (19635): disturbed earlier interment Sk (19670)
F.3522, Sk. (18667): undisturbed

F.3540, Sk (19670), Cut (19668), Fill (19667)
The earliest human interment in the central area west of the northwest platform in B. 97 was a juvenile, Sk (19670). The bones were in poor condition and highly fragmented. Disturbance to the burial had occurred in the south and west parts of the grave, probably for the interment of Sk (19635), a juvenile buried later. The skeleton was located in the eastern part of the grave cut (19668). The child's skeleton primarily consisted of leg bones and foot bones. The bones were first identified during the lifting of Sk (19635). The orientation of the foot suggested the head was to the north and the foot to the south.

F.3534 Sk (19635), Cut (19634), Fill (19633)
The next interment in the central area was a child aged 3 to 4 years at the time of its death. This interment disturbed the skeleton of an earlier burial Sk (19670), also a juvenile. The child (19635) was in a crouched (flexed) position in the northeast corner of the central floor. The body was placed in the grave with the head to the northwest, facing north. The head was on the left side while the body was on its right side. Thus the body was oddly placed with the head twisted to the opposite side of the body. Several cervical vertebrae were displaced, likely due to the position of the head relative to the body. The grave cut was clear and large enough to accommodate the body of the child, and yet the body was pushed into the back of the significantly undercut eastern portion of the pit. The age of this child is estimated at approximately 3 to 4 years based on dental development and eruption of the available anterior teeth.

F.3522, Sk. (18667), Cut (18668), Fill (18666)

Figure 77a (left). Primary inhumation of an adult, possibly male, F.3522, Sk (18667) from B. 97, view north. Figure 77b (right). Close-up of the feet of F.3522, Sk (18667) from B. 97. Photos Jason Quinlan

The last interment in the central area of B.97 was of an adult (18667), possibly male, located in the northwest corner of the central floor (Figure 77a). The tightly flexed adult male skeleton

was lying on his back with the head to the west and the feet to the east (Figure 77b). The flexed legs were tightly drawn to the chest, leaning slightly to the right side. The knees were close to the chin. The right arm was under the right leg and the left arm under the left leg. The hands were extended under the knees near the chin. A thick layer of make-up (18646) sealed the burial. The northern platforms were constructed over the burial cut later in the life of the building.

Phytoliths (18688) were noted and sample 18666.s4 taken on the lower legs at the mid shaft of the tibiae. All of the bones were lightly baked and friable due to the fire, which occurred above the floor. The bones are orange and brown but not black, suggesting the fire was short-lived and/or without sufficient intensity to seriously alter the bones buried in the platform.

East Platform (F.3547)

F. 3542, Sk (19689), Cut (19677), Fill (19676), Phytoliths (19688 above) (19690 under)A neonate in a tightly flexed position lying on its right side was found in the centre of the northeast platform (F.3547) of B. 97 (Figure 78a). The newborn was oriented with the head to the west and the feet to the east. The crushed head was facing southeast. The right arm extended under the body. The left arm was bent at elbow. The legs were tightly flexed at the hip and knees. Phytoliths (19688/19690) were found above and below the neonatal bones, suggesting the newborn was placed in a lidded basket or wrapped in matting at the time of its interment (Figure 78b). Unlike infants, neonates are not typically buried in baskets or matting at Çatalhöyük.

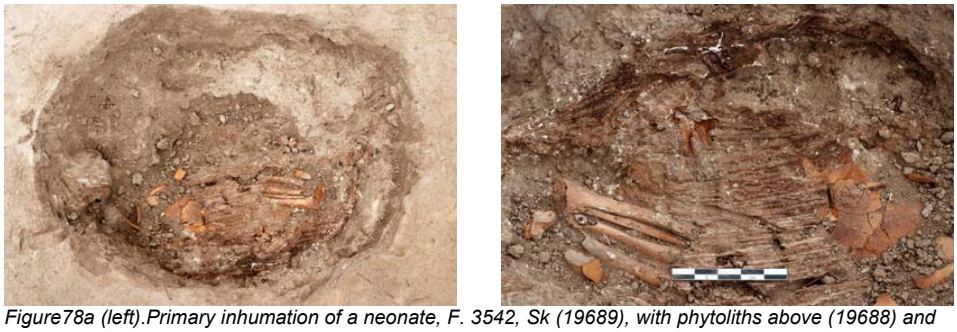

Figure78a (left).Primary inhumation of a neonate, F. 3542, Sk (19689), with phytoliths above (19688) and below (19690) the skeleton in the east platform (F.3547), view north. Figure 78b (right). Close-up of phytoliths above (19688) and below (19690) neonate, F. 3542, Sk (19689). Photos Jason Quinlan

Infill

The incomplete remains of two individuals were found in the context of the infill of B.97. Postcranial remains of a juvenile (18635) were found in the southeast corner of the house. A cranium (18645) without the mandible or postcranial elements was found in the southwest corner above a bin. These human remains from the infill are considered to be secondary or tertiary deposits. If they represent intentional inclusion in the infill materials at abandonment, for example, then a secondary context is suggested. However, these may be tertiary deposits that are the result of mixing infill with middens without intention.

Figure 79. Infill context of lower limb bones of a child, F.3520, Sk (18635), found mixed with animal bones in the southeast corner of B.97, view southeast. Photo Jason Quinlan

F.3520, Sk (18635), Cut (18636), Fill (18634)
The lower limb bones of a child 8 to 9 years old were found in the southeast corner of B. 97 (Figure 79). The child's bones (left femur, tibia, fibula and partial foot) appeared to be articulated at the knee upon discovery. The human remains were mixed with numerous animal bones including cattle, pig and dog in a matrix with inclusions of charcoal and ash. The southeast corner of B.97 is unusually shaped for Çatalhöyük houses in that the east and south walls do not meet at right angles. The 1960's excavations truncated this room fill with the expectation of a right angle in that corner, and therefore this fill was left in place when the upper levels of B. 97 were excavated. In 2010, two burials (19224, 19235), which had been truncated in the 1960s, were found in the upper levels of the fill in this southeast corner. Moreover, the walls in the corner are significantly undercut. A thick layer of animal bones characterised the deposit in this space where the child's limbs were found. One stone bead was found in the soils near the child's bones. The human remains could have been intentionally or inadvertently placed in this corner at or after the abandonment of the building.

F 3520, Fill (19245)
The room fill in the southeast corner of B. 97 also contained adult human cranial fragments and teeth (19245). Numerous animal bones were in the soils mixed with the human remains. In a manner similar to Sk (18635), it is likely these human remains were placed into the fill of B.97 at or after abandonment.

F.3521, Sk (18645)
The cranium of a middle adult male was found in the infill deposit above a bin located in the southwest corner of B.97. The bin had not been excavated in the 1960s. A poorly preserved antler fragment was found under the skull. Cattle bones were also noted in the infill near the cranium. It is likely the cranium was placed into the infill at or after abandonment of the house although it is possible that its presence is related to the abandonment event.

A cranial depression is present on the left parietal of the skull (18645). The teeth have moderate dental attrition. There is porosity of the cranial vault bones without expanded diploë. The mastoid is short and thick and the temporal line marked.

Fill (19640)
The soils from an animal burrow yielded human bone. Included in the disturbed soils are cranial vault bone fragments and cervical vertebrae (C2, C3, C3 or C4)

1960s backfill
MNIs were calculated for a large number of broken and disarticulated skeletal elements retrieved from 1960s backfill in the southwest quadrant of the South Area, B.100 (see R. Regan's Archive Report 2011). The determination of the MNI is based on the duplication of body parts (e.g., femurs) and by the differences in overall size of the bony elements (one is quite robust). An MNI of two individuals is suggested by the bones present in the sample.

Post Neolithic Burials from Çatalhöyük 2011, West Mound Trench 5 - Jennifer Byrnes

Excavations in Trench 5 on the West Mound yielded three post Neolithic skeletons. The three primary burials had been disturbed and were therefore incomplete. One inhumation, Sk (15390), was not fully excavated due to its placement at the junction of the shelter and the trench. One adult male, one adult female, and one child comprise the sample recovered during the 2011 field season. Position and orientation conform to the typical post Neolithic

Figure 80. Primary disturbed burial of F. 3340, Sk (15346), adult male. view north. Photo Peter Biehl.

pattern at Çatalhöyük where the body is extended and supine, head to the west and feet to the east.

F.3340 Sk (15346), Cut (19347), Fill (15348)

Feature F.3340 is a partially disturbed primary burial of an adult male (15346) (Figure 80). The burial was truncated by a later disturbance, which redeposited the upper body above the lower body. The lower body (inferior from T12) was in situ while the upper body was displaced. Originally the body would have been fully extended and supine, with the head in the western part of the grave and feet to the east. There was no observable grave construction, possibly due to the earlier disturbance to the grave when the upper body was moved or from other disturbances due to the proximity of the grave to the surface.

The majority of the upper body was recovered, except for the right clavicle and scapula, a few ribs, a few thoracic vertebrae, the left patella, and some of the hand and foot phalanges. The right forearm was pronated and flexed at the elbow, with the hand placed over the left ilium. The left forearm was disturbed but the left hand was pronated in situ, and placed over the right ilium. The legs were extended and parallel to each other. The preservation of the bones is good. Within the pelvis, fish remains were recovered. The location of the fish remains corresponds to where the rectal vault is situated in life. The sampled remains will be further examined for evidence of having been digested.

The sexing of the skeleton was based on the pelvic morphology. Age assessment is based on the auricular surface, providing an estimate of between 45 to 59 years. Stature estimation is based on the length of the femur at 167.64 cm +/-7.62 cm.

A late period ceramic vessel (handle and body sherd) was recovered from the foot of the grave. In addition, phytoliths were evident at the foot of the northeast section of the grave in the dark gray, loose soil. The phytoliths and soil were sampled as possible burnt grave offerings of some type of plant material.

Figure 81. Small ossified mass between T12 and L1 of the spinal column of F. 3340, Sk (15346). Photo Peter Biehl.

In terms of health, the individual had a moderately sized abscess on the left maxilla that also has an opening into the hard palate. There were some observable degenerative changes in the spinal column as well, including Schmorl's nodes on thoracic vertebrae and minor bony osteophytic lipping of the lumbar vertebrae. There was a small ossified mass on the anterior surfaces between thoracic vertebra 12 and lumbar vertebra 1 bodies (T12/L1) (Figure 81). This could potentially be the beginning of the ossification of the anterior longitudinal ligament as well as DISH – though the exact etiology cannot be said for certain.

F.3347 Sk (15390), Cut (19392), Fill (15391)

Feature F.3347 is a partially disturbed primary burial of an adult female (15390) (Figure 82). The burial was below F.3340, and likely slightly disturbed by the same disturbance pit that moved the upper body of F.3340. The upper body of skeleton (15390) was not fully excavated this year as it posed a safety situation with the current shelter location. The lower body was excavated as it was already exposed.

Figure 82. Primary disturbed burial of F. 3347, Sk (15390), adult female, view west. Photo Peter Biehl

The preservation of the partial skeleton was poor as it was in a very fragile state. Many of the bones fragmented when they were lifted. The body was fully extended and supine, with the head oriented towards the western part of the grave and the feet to the east. The right arm was in situ, and was straight and parallel alongside the body. The left arm was disturbed, and not fully recovered.

The sexing of the skeleton was based on the pelvic morphology. Age assessment is based on the pubic symphyseal surface, providing an estimate of 27-56 years, making this individual a middle aged female.

There were no observable pathological conditions or evidence of trauma observed on the skeletal elements of this individual.

The right proximal ulna of a separate individual was located in the fill (15391) of this grave that is not from either F.3347 or F.3340. This may belong to an individual whose remains were scattered in the topsoil south of F.3347 and F.3340.

F.3342 Skeleton (15383), Cut (15381), Fill (15385), Mudbrick (15382)

Feature F.3342 is a primary burial of a juvenile (15383) which is too young to be assigned sex (Figure 83). The grave cut (15381) was clearly defined in the Chalcolithic wall (F.3344). The burial was highly disturbed by animal activity, removing some elements and scattering others throughout the grave fill. Nonetheless, some elements were in situ, including the head, the left scapula and humerus, some ribs, the right ilium and sacral elements, and the right tibia and fibula. The burial was oriented east-west, with the head in the western part of the grave with the face up. The body was extended and supine.

Figure 83. Primary disturbed burial of F. 3342, Sk (15383), child, view west. Photo Peter Biehl

The burial was lined with brown mudbricks (15382), encircling the borders of the top of the grave. There were seven iron nail fragments located in the fill (15385), indicating the use of a coffin for interment. There was one worked bone piece, but it is unclear if this was a grave good from the later period or if it was Chalcolithic material used to fill the grave.

An age assessment of six years (+/- 2 years) was based on dental development and eruption and the state of epiphyseal fusion of several elements. There were no observable pathological conditions or trauma related responses on the skeletal elements present.

There were a few isolated adult bones (C1 and trapezium) also located in the grave fill. These bones will be reassociated with some of the other isolated adult bones located in adjacent units next season.

4040 Post Chalcolithic Cemetery - Sophie Moore

Mark Jackson and Sophie Moore were present at Çatalhöyük for an intensive week of study during August 2011 in order to work on the post Chalcolithic burials in the 4040 Area for publication (in prep). Time constraints meant that the scope of the work was limited to an attempt to create a typology of burials. The burials were split into three groups on the basis of a number of features: placement of the body in the grave cut, the shape of the grave cut, the location of the grave within the excavated area and the nature, presence or absence of material culture within the grave. An attempt was also made to establish the relative

chronology of the groups. We were able to examine the majority of the small finds present in the Çatalhöyük site depots and included the etutluk items in our analysis; however we were unable to include the Enventer items which are kept in the Konya Archaeological Museum.

The results of this study will be presented in full within the forthcoming site report volume, however they can be summarised as follows: Twenty-eight burials have been categorised as Group I burials. Group I burials have sharply defined straight-sided grave cuts lined with wood or tiles containing supine extended individuals. These graves are clustered in the north of the 4040 Area. Fourteen group I burials contained artefact assemblages dating to the 1st or 2nd century AD.

Thirty-three burials have been categorised as Group II burials. These burials have very few positively diagnostic features other than they are aligned east-west with the crania at the west end of the graves and clustered in the southeast corner of the 4040 Area. The interments have no grave goods and are, in general, pit graves with a few indications of shrouding. This group of graves also contains three features, which include tiles. This lack of other positively diagnostic features might reflect Early Christian practice. This group is likely to date between Late Antiquity and the Late Byzantine period.

Ten burials have been categorized as Group III. These burials are all single inhumations in narrow grave cuts, either pit graves or mudbrick-lined graves. The group is identified largely on body position; individuals are inhumed with their heads to the west end of the graves lying extended on their right sides to face south. There are no grave goods in their primary contexts within this group. The placement of the bodies in the grave cuts suggests that they were tightly shrouded. These burials are likely to be Early Islamic.

Once the burials had been categorised into groups, samples of bone from 13 skeletons were taken for radiocarbon dating. The unit numbers from which samples were taken are as follows: (7907), (8764), (10715), (10006), (10255), (8879), (10339), (12651), (12664), (12398), (13184), (15028) and (15021). The results of this program of dating will not only test the validity of the groups into which the burials have been categorized but also establish a terminus post quem for the foundations of Building 41.

Acknowledgements
Lori D Hager and Başak Boz extend many thanks to the people who helped with the excavation and lab work on the Neolithic human remains during the 2011 field season: Onur Yuksel, Lauren Monks, Lauren Field-Fidler, Tiffany Soule, Kelly du Rand, Sayeh Fattahi, Sarah Gonzaga, Sara Ouenes, Katherine Rose, and John Isaac Holson. In addition the Project would like to thank Pacific Legacy, Inc. for their generous support of Lori D. Hager on the human remains team. Jennifer Byrnes extends her thanks to the Cambridge students for their help in the post excavation cleaning and analysis of the post Neolithic burials.

Philippa Ryan* 2011 Phytolith Archive Report

*British Museum

Study Season
Time on-site this year was primarily orientated towards attending the study season.

How phytolith data could contribute to several larger themes was discussed - such as storage, ‘internal versus external activities’, and the environment. Phytolith data has suggested storage of domestic and wild plant foods and evidence for basketry within bin contexts. Comparisons of phytoliths present in ashy deposits from internal fire-installations and external fire-spots have suggested some spatial differences in locations of cereal processing and types of fuel burnt. Phytolith data have suggested exploitation of wet and dry-land habitats for food and non-food purposes (such as brick temper, basketry, fuel), whilst dramatic increases in phytoliths from Phragmites reeds suggest some changes in the use of wetland areas and the biodiversity of plants present in these habitats.

An interesting West Mound sample & temporal perspectives
A small number of samples were analysed whilst on-site, and one sample of particular interest was (16951) Trench 5 West Mound. This sample was an ashy deposit with phytoliths from burnt Phragmites reeds and cereal straw in densities and proportions that were similar to ashy deposits analysed from the latest East Mound TP phases. Cereal straw was infrequently present in the phytolith record from the East Mound but high proportions were present in some of the TP contexts analysed. There were dramatic increases in Phragmites reeds in the East Mound phytolith record from South.P-Q onwards, reaching highest relative proportions and quantities in TP contexts (temporal trends in the East Mound were analysed mainly from the midden and fire-spot/oven/hearth context categories). Overall, phytolith content from this West Mound ashy sample shows some similarities with later phase East Mound ashy samples.

Mollusc Shells at Çatalhöyük: The 2011 Study Season - Daniella E. Bar-Yosef Mayer (1) & Burçin A. Gumuş (2)

(1) Department of Zoology, Tel Aviv University, Tel Aviv, Israel, (2) Gazi University, Biology (Zoology) Department, Ankara, Türkiye.

The two weeks study period of the shell team concentrated around “cleaning” of our records and preparing them for publication. A few shell beads were found not previously recorded and were added to our database. The database was updated, especially by adding an “artefact” criterion, to facilitate the separation of shell artefacts from ecofacts.

The preparation of data studied over the last few years for publication, included a report on Mollusc Exploitation at Çatalhöyük, which was reviewed and updated. We also expanded on the topic of shells used as beads, to be included in the Bead chapter in the upcoming thematic volume. High quality photographs of some shells (both artefacts and ecofacts), which were taken under the microscope by Jason Quinlan and Burçin Gumuş, enabled further study and revision of the identified species.

The most significant revision concerned that of microshells, as well as the Unio bivalves. The taxonomy of several of the species was revised following an in-depth study in between field seasons. The most significant revisions were as follows:

- Unio pictorum was replaced by Unio cf. hueti Bourguignat, 1855.
- Theodoxus fluvatilis was replaced by Theodoxus cf. heldreichi heldreichi (Martens, 1879).
- Bythinella dunkeri was replaced by Bythinella cf. turca Radoman, 1976.
- Bithynia leachi was erased from the list.
- Galba truncatula (O. F. Müller, 1774) was identified and added to the list.
- Gyraulus (Armiger) crista (Linnaeus, 1758), was identified and added to the list.

Another aspect of our project concerns the use of freshwater shells for a palaeoclimatic and seasonal reconstruction. Additional samples of Unio shells were selected and exported for further study. The isotopic information will be analysed by Dr. Melanie Leng of the British Geological Survey, Nottingham, and dating of the shells will be carried out by Prof. Wu Xiaohong of Peking University.

West Mound Pottery, Trench 5-7 - Ingmar Franz*

*Freiburg University

Summary
Beside the continuing sorting, weighing, counting, labelling and refitting of pottery, the laboratory work focused in 2011 on the documentation of production marks on vessels and on close-up photography of unfired clayballs as well as of unfired pottery for material composition evaluations. We also continued with 3D-scanning of different vessel types for building up a digital pottery 3D-model reference collection of the Trench 5-7 material and to evaluate the potential of this technology for production mark analyses. As in 2010, dozens of material

samples were exported to complete the sample series of all different raw materials discovered and of all vessels defined so far. To date all the material from 2007 to 2010 and a small number of units of the 20 pottery crates from 2011 was processed which amounts to more than 960 kg of pottery consisting of more than 58,000 sherds (Table 5 & Figure 84).

	weight in g	amount of sherds
undiagnostic	535, 913	47, 894
diagnostic	432, 926	10, 920
total	968, 839	58, 814

Table. 5. Processed pottery from Trench 5-7 to date.

Figure 84. Pottery excavated 2011 drying in the sun after washing. Photo West Tr.5 Team

Unfired clayballs

In order to get comparable data about the cache of unfired clayballs from Space 449 all the material excavated in 2010 was weight with a 30kg luggage scale in several steps and has an overall weight of 53 kg. One crate of clayballs was analysed in more detail. All the balls and ball-fragments were carefully dry-brushed and sorted by their general shape. Three main shapes could be distinguished: Clayball-Type A has a more or less a spherical shape, Type B a biconical and Type C a cylindrical shape (Figure 85 a-c). All these shapes can be explained by the way the wet clay was rolled between two hands. The different sizes and shapes of clayballs indicate that they were made by different hands with different sizes and in different movements. The mean weight of a clayball is about 60g, which means that we excavated in 2010 around 880 clayballs. Almost all clayballs show at

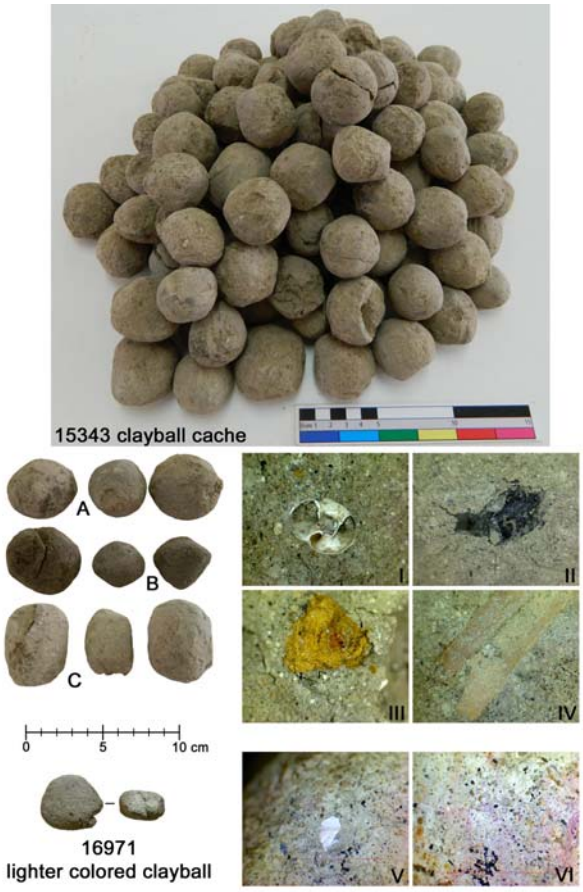

Figure 85. Clayball cache from Space 449: Different types of clayballs and close-up photos. Lighter coloured clayball from Unit (16971) in Space 342. Figure Ingmar Franz

least one flattened surface and no single impression of fingers, mats or basketry, which indicates that they were dried in the sun near the clay pit before transportation. Clayballs with interesting inclusions like snail shells, bone splinters or bigger suspicious unidentified inclusions were selected for close-up photography with a digital USB microscope camera (Figure 85 I-IV). During finds sorting we fortunately found in the last days of excavation one lighter coloured clayball in Unit 16971 from Space 342 which contains mollusk shell fragments and red streaks (Figure 85 V-VI). It is very likely that we deal with a second yellow-reddish lighter colored pottery raw material instead of the greyish darker material found with the clayball cache.

Unfired pottery

This season we found in 22 Units several clusters of unfired pottery of which some could be refitted (Table 6 & Figures 86, 87, 88, 89). So far, 68 Units from almost all Spaces in Trench 5 contained unfired pottery. Only Spaces 446, 447, 448 and 451 have not yet provided unfired pottery (Table 2 & Franz, 2009 Archive Report & Franz, 2010 Archive Report).

Unit Number	Provenance (Trench/Space)	Description	Unit Number	Provenance (Trench/Space)	Description
15174	5 / 345	pieces (lighter colored clay) + clusters (1 base (15174/X.6), 1 rim-neck (15174/X.7))	16949	5 / 343	large cluster (painted)
15348	5 / 342	1 piece	16950	5 / 340	pieces (cluster?, covered in ash)
15357	5 / 342	1 piece	16951	5 / 340	cluster (covered in ash)
15359	5 / 342	pieces (painted, lighter colored clay) & cluster (15359/X.8, painted)	16958	5 / 342	cluster (16958/X.1, painted)
15360	5 / 342	cluster (base)	16959	5 / 342	cluster (painted rim)
15380	5 / 449	Pieces	16962	5 / 342	cluster
15389	5 / 340	Pieces	16964	5 / 450	1 piece (painted)
16928	5 / 454	Pieces	16966	5 / 342	pieces + painted rim
16936	5 / 449	Pieces	16967	5 / 454	pieces (painted)
16938	5 / 342	clusters (16938/X.3, painted rim-neck)	16969	5 / 340	pieces
16939	5 / 342	pieces (painted , lighter colored clay)	18325	5 / 342	pieces
16946	5 / 345	pieces (base)	18340	5 / 345	handle (18340/X.13) + 1 piece

Table 6. Continued list of unfired pottery from Trench 5.

In 2010, a fragmented part of an undecorated relatively thick-walled vessel was found in Unit 18318 in Space 310. The wiped and unburnished inner surface indicates a restricted opening, i.e. that it is most likely a piece of a storage vessel. In Unit 18326 of the same Space one cut- and prick-ornamented sherd was found, which is the evidence that beside painted pottery also incised pottery was made at Çatalhöyük. A part of a painted storage vessel (most likely a so-called painted necked jar) was found in Unit 15335 in Space 453 in the same year. Already two years earlier two very important finds were made in Unit 16889 in Space 343 and in Unit 15584 in Trench 8: The first is a sherd of a painted vessel with restricted opening, which has on the inside a layer of lighter coloured clay. The latter are two matching sherds of a painted carinated bowl, which was painted on both surfaces. With this find we have evidence for unfired pottery from all the trenches of the West Mound, i.e. Trench 1, Trench 5 and Trench 8 (Figure 86). In Unit 16939 in Space 342 we discovered this year also one sherd of a vessel which was made of two different clays and in Unit 16938 in the same space we found the fragmented rim-neck-part of a painted necked jar. The other important find are the pieces of another painted necked jar found in 2009 in Unit 18328 in Space 342. After close examination, some of them show unusual impressions on the inner surface of which some could be textile impressions (Figure 87). Last year in Unit 15180 in Space 449 the fragmented base of a larger storage vessel was found (Figure 88). This year in Unit 15174 in Space 345 two clusters of unfired pottery were found which consist of a lighter coloured yellowish clay.

One is the base of a storage vessel and the other the rim-neck-part of an unpainted necked jar. The rim-part of a painted carinated bowl was found in Unit 18337 in the same Space two years ago (Figure 89).

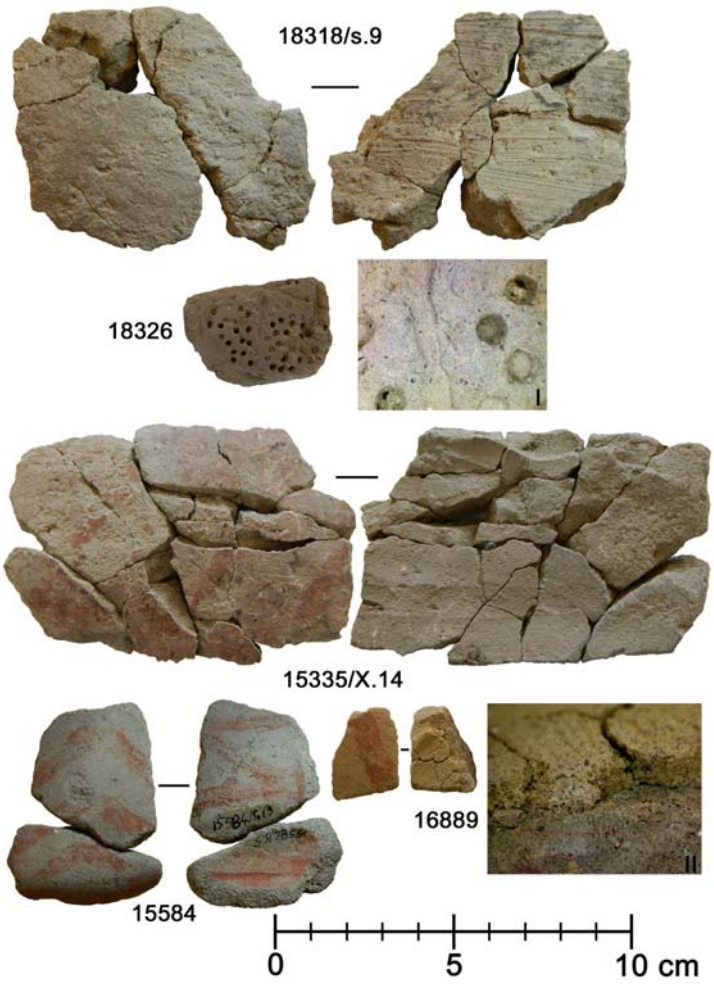

Figure 86. Unfired pottery from Space 310, Space 343, Space 453 and Trench 8. Figure Ingmar Franz

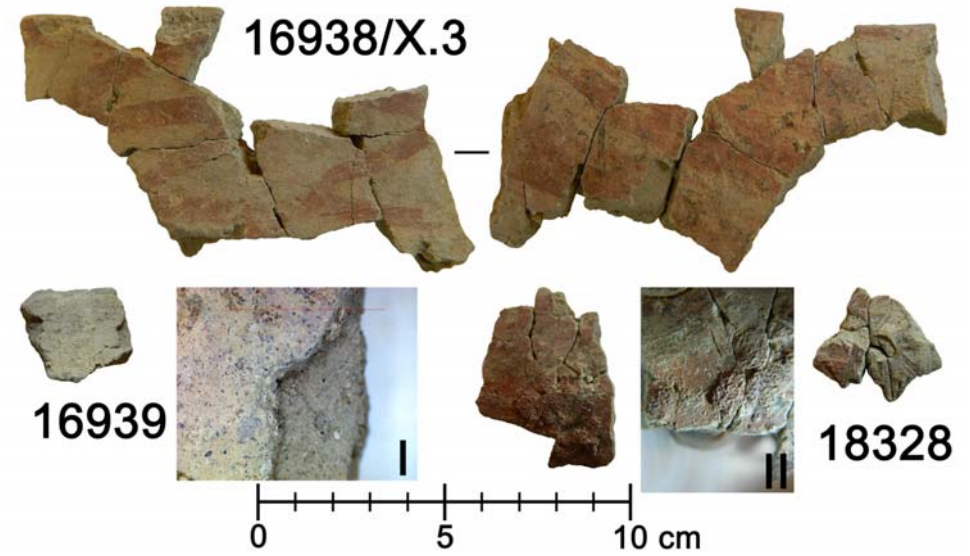

Figure 87. Unfired pottery from Space 342. Figure Ingmar Franz

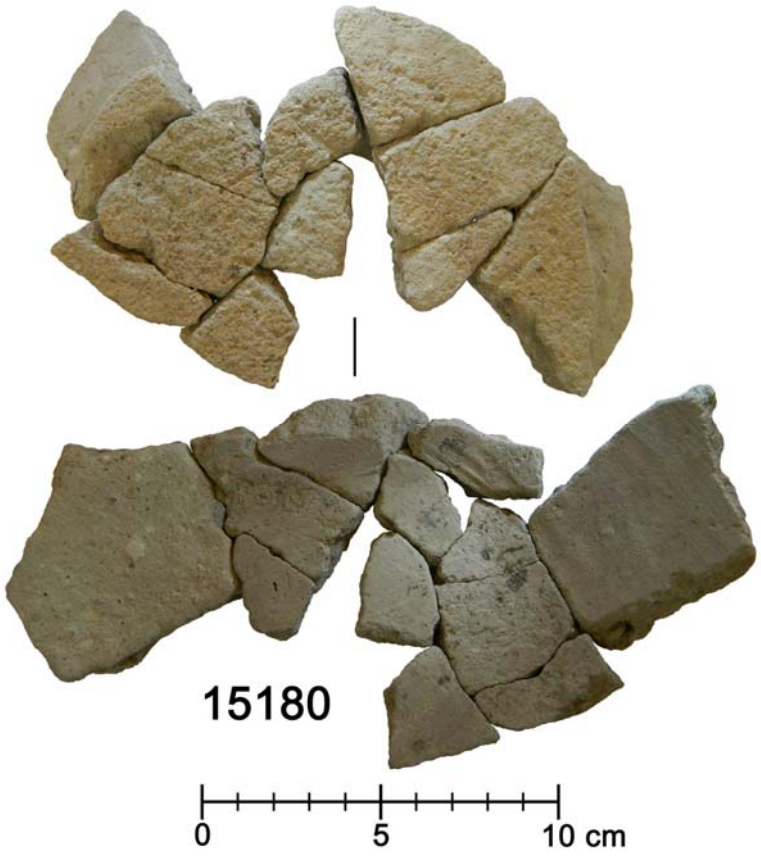

Figure 88. Unfired pottery from Space 449. Figure Ingmar Franz

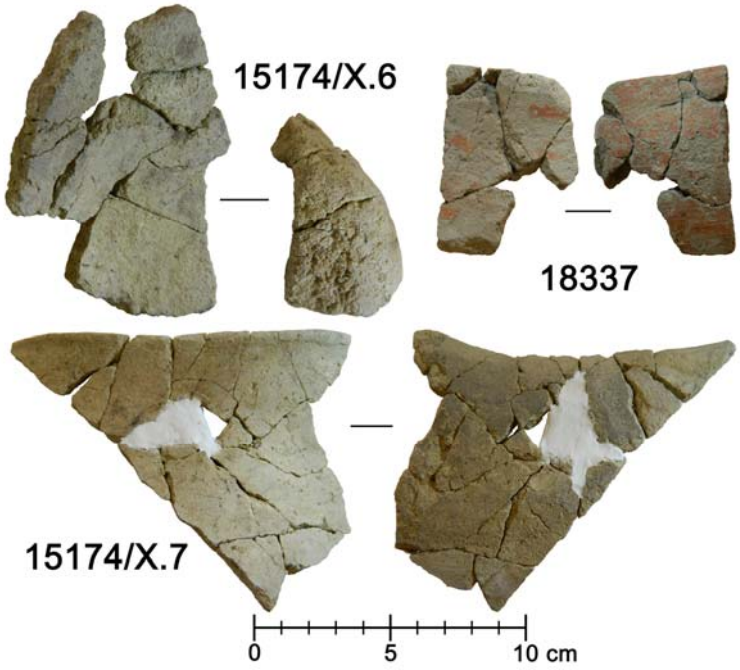

Figure 89. Unfired pottery from Space 345. Figure Ingmar Franz

Potter's bone tools

Though possible bone tools for pottery production were mentioned and depicted in the Archive Reports on the pottery from Trenches 5-7 in 2009 and 2010 (Franz, 2009 Archive

Report, Franz, 2010 Archive Report), Nerissa Russell, zooarchaeologist and bone tools specialist did a quick examination of these worked bones and bone fragments from Trench 5 and 7 this summer. The results of this preliminary analysis is that at least 31 examples show ceramic wear (24 from Trench 5 and seven from Trench 7). The following figures show most of them (Figures 90, 91, 92).

Vessels defined in 2011

This season 21 new vessels from Trench 5 could be defined. For future analyses also seven vessels from other Areas (Trench 1, TP, IST, 4040, and KOPAL) were incorporated in the list of vessels, which comprises so far altogether 119 artefacts (Table 7).

Cooking pots are still quite rare in the material found on the West Mound and no single complete profile could be refitted so far. In Unit (15174) in Space 345 we found this year a cluster of Neolithic-looking sherds which by refitting turned out to be a fragmented part of a cooking pot (Figure 93). This is the fourth cluster of Late Neolithic pottery found in Trench 5 (see Franz, 2010 Archive Report). In 2003 Jonathan Last's team found in Trench 1 in Unit (7781) a similar vessel which is the most complete cooking pot known from the West Mound of Çatalhöyük so far (Figure 93).

Figure 90. Potters bone tools or fragments of them from Space 310.

Figure 91. Potters bone tool from Space 310. Figure Ingmar Franz

Figure 92. Potters bone tools or fragments of them from Space 342, Space 343 and Space 450. Figure Ingmar Franz

Vessel number	Unit-number	Provenance (Trench/Space	Description	Possible function
92	6003	KOPAL	red slipped bowl with S-profile	serving
93	17809	TP	red slipped bowl with C-profile and feet	serving
94	13530	TP	slightly restricted bowl with C-profile	serving
95	12259	TP	slightly restricted bowl with C-profile and I-beads	serving / storage / cooking
96	12451	IST	flat bowl with L-profile and feet	serving
97	10081	4040	ellipsoid bowl with C-profile, extended rim and perfortations	serving / storage
98	7781	Trench 1	ellipsoid slightly restricted bowl with S-profile and lugs	cooking
99	15180	5/449	double-sided painted bowl with C-profile	serving
100	15180	5/449	double-sided painted bowl with C-profile	serving
101	15355	5/454	double-sided painted slightly restricted bowl with C-profile	serving
102	15160 + 15180	5/449	inside painted bowl with C-profile	serving
103	16967	5/454	painted zoomorphic bowl (duck) with \-profile and head-shaped handle	serving
104	15174	5/345	painted slightly restricted carinated bowl with C-profile	serving
105	15160 + 15180	5/449	double-sided painted slightly restricted bowl with C-profile	serving
106	15180	5/449	double-sided painted slightly restricted carinated bowl with C-profile	serving
107	16968	5/343	double-sided painted bowl with \-profile	serving
108	15174	5/345	double-sided painted flat bowl with C-profile and standring	serving
109	16966	5/342	double-sided painted ellipsoid bowl with \-profile and handles	serving
110	16967	5/454	painted carinated bottle with S-profile and ^-beads	serving / storage
111	15360	5/342	double-sided painted square bowl with C-profile	serving
112	16966	5/342	double-sided painted carinated ellipsoid bowl with S-profile	serving
113	16966	5/342	double-sided painted carinated restricted bowl with C-profile and noblets	serving
114	15359	5/342	double sided painted carinated ellipsoid bowl with S-profile, noblets and standring	serving
115	16949	5/343	double sided painted carinated ellipsoid bowl with S-profile, noblets and standring	serving
116	16962	5/342	double-sided painted ellipsoid bowl with \-profile	serving
117	15174	5/345	double-sided painted slightly restricted carinated bowl with C-profile	serving
118	15174	5/345	restricted ellipsoid bowl with S-profile and handles	cooking
119	15174 + 15174	5/345	double sided painted carinated ellipsoid bowl with S-profile, noblets and standring	serving

Table 7 Continued list of defined vessels relevant for future analyses.

Figure 93. Cooking pots from the West Mound of Çatalhöyük: a Late Neolithic cooking pot from Unit (15174) in Space 345, and a "Early Chalcolithic" cooking pot from Unit (7781) in Trench 1. Figure Ingmar Franz

Beside the masses of serving ware also a lot of storage vessels were found in Trenches 5-7, of which some were already presented in the last Archive Reports (see Franz, 2008-2010 Archive Report). Also this time some storage vessels or reconstructions of them are presented. Figures 94 & 95 show three of the four different vessels found together on a surface in Trench 7 in 2007 (see Franz, 2007 Archive Report). Figure 94 illustrates the reconstruction drawing of the huge restricted bin-shaped vessel with C-profile found in Unit 15119. In Figure 95 this reconstruction is confronted with the other two vessels found in Units 15104, 15107 and 15117 to show the size-relations. The smallest vessel is an incomplete so-called "basket-handled" vessel of which unfortunately the distinct handle is missing. Normally this kind of U-shaped handle reaches from one side of the rim to the other.

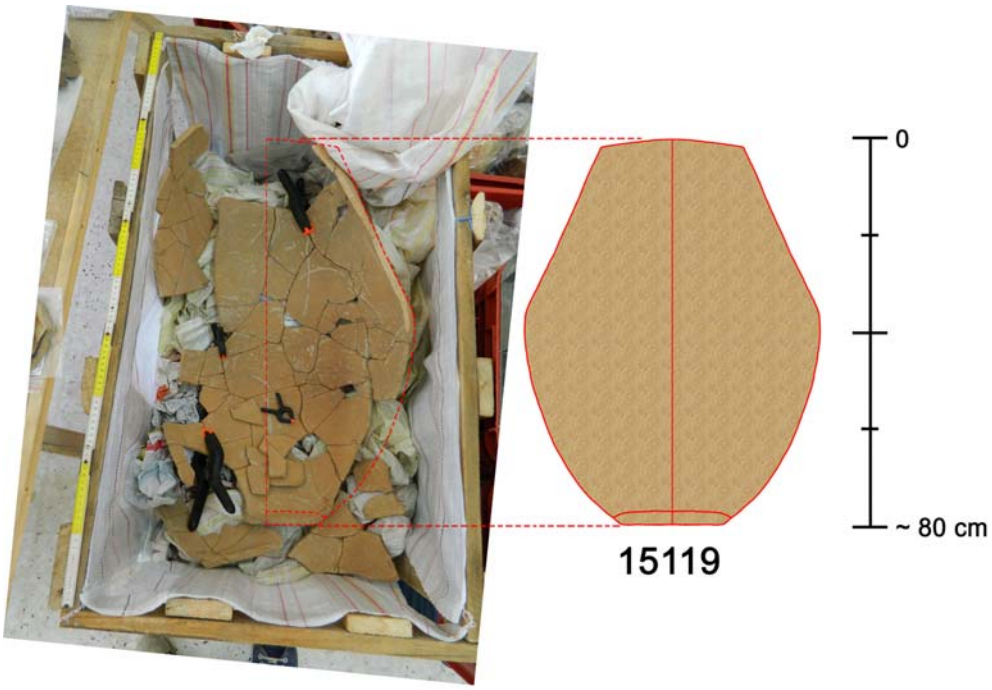

Figure 94. Photograph and reconstruction drawing of a huge storage vessel from Unit 15119 in Trench 7. Figure Ingmar Franz

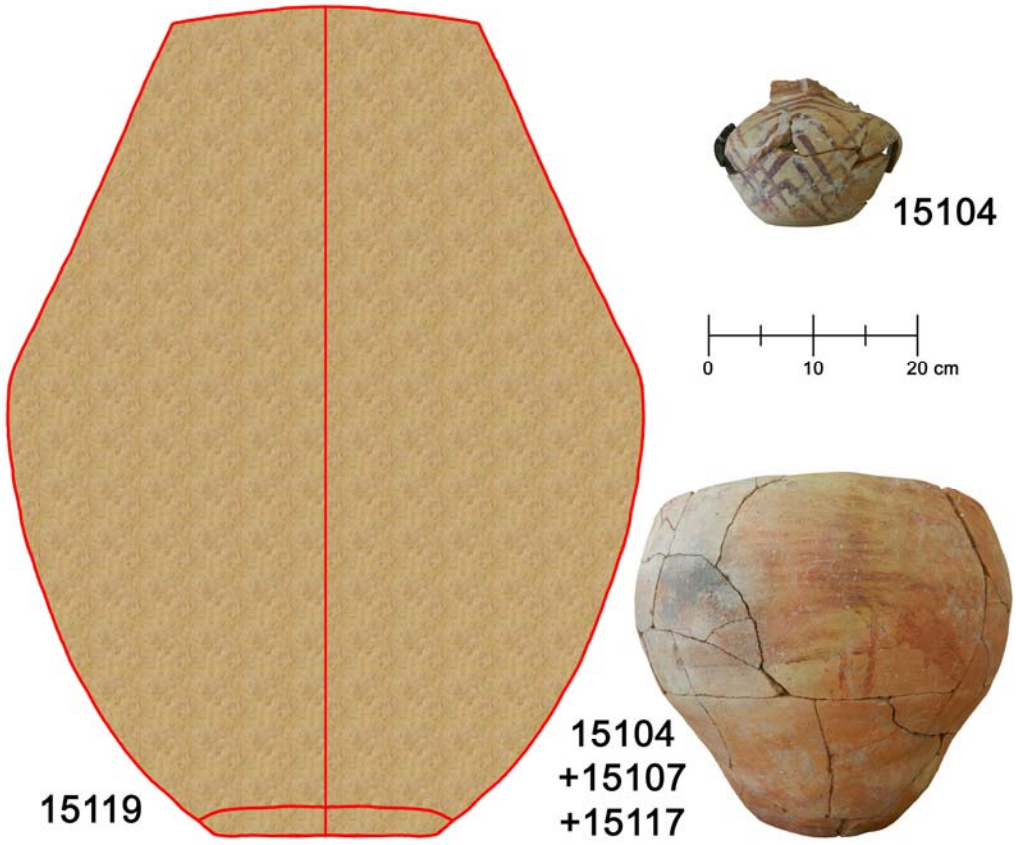

Figure 95. Three of four storage vessels found together on a surface in Trench 7. Figure Ingmar Franz

In order to further document all different main vessel types from Trench 5-7 six serving vessels excavated this year are presented in the following two figures: an almost complete half of a double-sided painted ellipsoid bowl with \-profile and handles from Unit (16966) in Space 342; a piece of a double-sided painted bowl with \-profile from Unit (16968) in Space 343; an almost complete double-sided painted flat bowl with C-profile and standing (15174/X.4) and a heavily fragmented double-sided painted slightly restricted carinated bowl with C-profile from Unit (15174) in Space 345. Latter is made of very light coloured clay which most likely is the fired version of the light coloured clay described above (Figure 96). There are two other very interesting vessels from Unit (16967) in Space 454: a painted carinated bottle with S-profile and ^-beads (16967/X.22) and the first zoomorphic vessel from Çatalhöyük West known so far, which looks like a duck-like water bird (Figure 96 & Figure 97).

3D scanning of vessels

Patrick Willett continued 3D-scanning of vessels with a Next Engine Desktop 3D Scanner, but he could scan only nine artefacts this season due to his surveying job in Trench 5. So far Vessel 9 (17312/X.2), Vessel 20 (13700), V51 (15179/X.11), V56 (18328/X.3), V67 (15160), V69 (18341/X.38), V75 (15160/X.36), V77 (15177/X.11), V78 (15160+15177+15180), V103 (16967/X.15) were scanned. Because the scanning process is relatively slow and depends heavily on the artefact's size and surface properties only good preserved main vessel types with a suitable surface were chosen for scanning. It showed that production marks which are hardly visible to the naked eye appear in the scans if the resolution and with it the scanning time is higher (Figure 98).

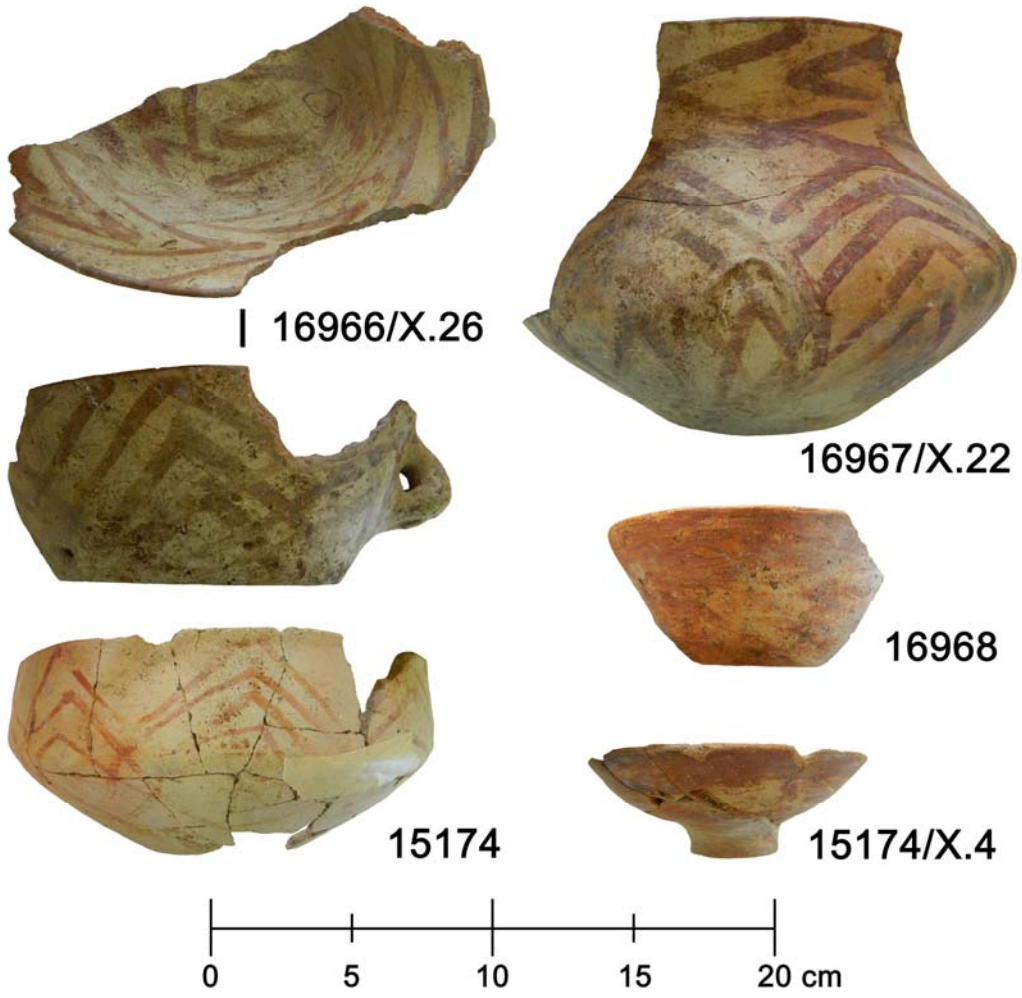

Figure 96. Different types of serving vessels found 2011 in Spaces 342, 343, 345 and 454. Figure Ingmar Franz

Preliminary results of material analyses

Last year 55 samples of vitrified pottery, fired pottery, unfired pottery, and raw materials were exported. IR-Spectroscopy analyses were run by Sonia Ostaptchouk at the Centre of Infrared Spectroscopy at the MNHN in Paris and XRF analyses were run by Markus Helfert at the Institute of Archaeological Sciences at the Goethe University Frankfurt. With the first method the material compositions and the firing temperatures should be detected, with the second method the chemical fingerprints of the different materials should be defined

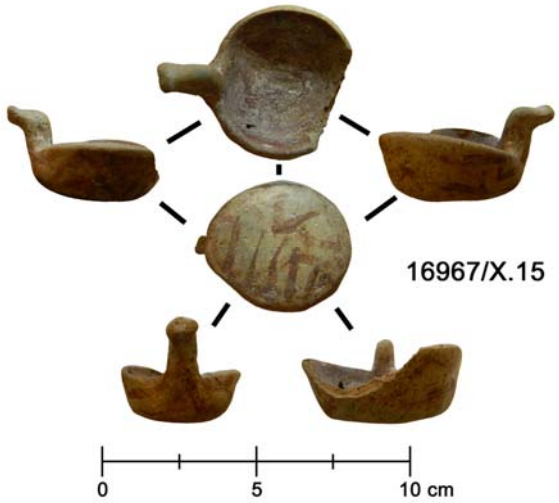

Figure 97. The first zoomorphic vessel (duck-like water bird) from Çatalhöyük West found 2011 in Space 454. Figure Ingmar Franz

for future raw material origin comparisons. The preliminary results of IR- Spectroscopy show that at least one slag from Trench 5 is indeed vitrified pottery (see Franz, 2010 Archive Report). The original clay is a mixture of the clay minerals kaolonite and smectite together with quartz and calcite in more or less the same proportions. The analyses of samples of fired pottery in combination with a firing experiment indicate different firing temperatures, which lay between 650°C and 950°C. The red pigments found in Trench 5 are different iron oxides with traces of hematite. In seven cases silica glass was observed which indicates a volcanic origin for these red pigments. The XRF-analyses showed that all the fired and unfired pottery samples except one have very similar chemical fingerprints and therefore must be from the same area, in our case Çatalhöyük. Very interestingly, the samples of the 'Late-Neolithic-like' pottery from Trench 5 are more similar to a Late Neolithic vessel from KOPAL-area then to the painted Early Chalcolithic pottery from Trench 5. Even the samples from Trench 5 and Trench 7 show a slightly different chemical composition. This year again dozens of samples of fired and unfired pottery, clayballs and pigments were exported for further IR-spectroscopic, XRF- and thin section analyses. In this way the sample series of all different raw materials discovered and of all vessels defined so far will be continued.

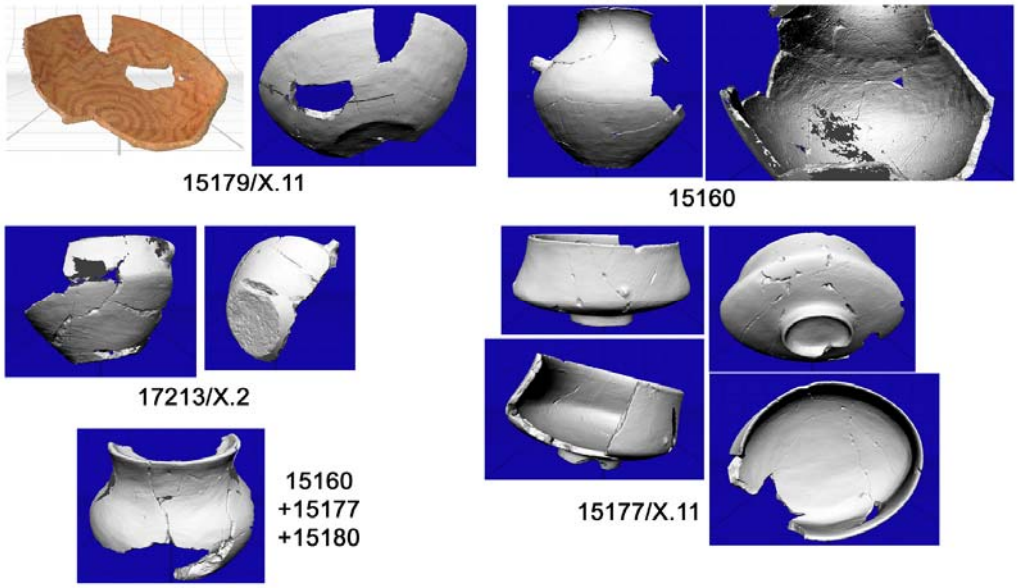

Figure 98. 3D scans 2011 showing production marks on vessel surfaces. Figure Ingmar Franz

Acknowledgments
I want to thank Sonia Ostaptchouk (IR-Spectroscopy) and Markus Helfert (XRF-Analysis), Patrick Willett (3D-scanning), Nerissa Russell (bone tools), all the West Mound Team (sorting, weighing, counting, measuring), Ashley Lingle and her helpers (refitting and conservation of vessels), and Nurcan Yalman, Duygu Tarkan Özbudak, Hilal Gültekin and Ozan Özbudak for their support and discussions.

Clay and Landscape Studies - Chris Doherty*

*Oxford Research Laboratory for Archaeology

While the main emphasis this season was on discussion and final writing for the forthcoming publications, there was still the usual range of clay and geological issues to address. As always, some of these concerned new material from excavation, while others were related to the archive. And as usual, the relatively simple initial questions, such as "what is it", has lead to new areas to consider.

New identifications

The commonest task for the site geologist is to identify new materials that turn up in excavation. Usually the experienced excavation teams have a good idea of what a find is made from, and simply require a confirmation. This may be possible in situ, or require samples to be inspected in the on-site laboratories using optical microscopy. Where greater detail is necessary, permission is sought to export small sub-samples to the UK for analysis by scanning electron microscopy.

Of particular interest this year was Building 77 in the North Area. Just three finds required geological examination but each presented further questions. The first object was a small stone palette from a grave fill (Figure 99 (a), (b) and (c)). This was made of a pinkish stone and had traces of red pigment adhering to one surface. The excavation team had two questions: what type of stone was it made of, and was it used for processing and/or applying red pigment?

Figure 99 - The use of red pigment in Building 77. (a) the pinkish stone palette: what is this made of and where is it from? (b) cinnabar traces on the lower surface: - was this from use or is it simply adhering grave fill? (c) frequent use of red ochre in Building 77: the darker red hue of the of lower east wall panel suggest cinnabar (d) hand prints on the upper north wall: the lighter hue suggests iron ochre. Photos a, c and d Jason Quinlan, b Chris Doherty.

Pink-coloured rocks are unusual and are mainly restricted to slates and related lithologies. As can be seen from figure 99, this palette had a slate like-appearance, and so was recorded in situ as a phyllite, (the geologically more precise term for a low-grade slate).

The second identification was of the red pigment adhering to this stone palette: this can just be seen in figure 99(b). Red ochre was used at several locations in Building 77, most prominently for the well-preserved handprints exposed on the north wall (figure 99(d). However, some red-coloured panels are of a much darker hue, suggesting the use of cinnabar (mercury sulphide).

On-site microscope analysis identified the red pigment adhering to the stone palette as cinnabar. This identification has now been verified using scanning electron microscope analysis on a sub-sample exported to the UK. So immediately, new questions are raised about the relationship between iron ochre and cinnabar. Both are used in Building 77 but what does this mean? Cinnabar has a much more dramatic and intense red colour than iron ochre. It is also more exotic, being a much rarer pigment than iron ochre. Would these characteristics have made this a "special" pigment? and if so why was it so prevalent in Building 77?

Then there is the relationship between the cinnabar and the phyllite palette. The cinnabar is only loosely attached to the palette but flecks of cinnabar are abundant in the surrounding grave fill (U.19295). So had the palette been used for cinnabar processing or application, or was it simply buried with cinnabar (plaster or decomposed ore) in the fill?

Here it was necessary to take another look at the stone palette. Microscope examination now revealed that although this is outwardly similar to true phyllite, it was in fact a type of hard recrystallised (dolomitic) limestone. A cross-section of a small fragment showed it to have a dark brown body, whose outer 1-2mm had been bleached to a pale pink. Scanning electron microscopy suggested that there might also be a very fine dusting of cinnabar within the matrix of this lithology, although this evidence was marginal. There was no obvious use wear on this palette to indicate the working of cinnabar, but in many ways this observation is inconclusive as this mineral is a very soft and would not be expected to mark this dolomitised limestone (unless a hard tool was used). But as figure 99 shows, the flat surfaces have been left in a rough state and have not been dressed to make them more suitable for working with pigment.

A further observation is that the pale pink patina extends around all surfaces and not just the upper of the two main flat areas. This cannot be accounted for by wear, but instead suggests some interaction with the grave fill. So, on balance, it would seem that this stone palette has not been used for pigment mixing, and its pink colour is natural. The flecks of adhering cinnabar are more likely to have been picked up from the grave fill.

But this is not the complete story. A consideration of the rock type used for this palette suggests that it was related to the cinnabar, even if it had not been used as a tool. Cinnabar deposits are associated with past volcanic activity and there are numerous deposits to the south-west and north of Konya, with other further east around Niğde. By far the largest of these is at Sizme, some 30km north of Konya. This was thought by Mellaart to have been the source of Çatalhöyük's cinnabar, as it was certainly a major production centre by the Iron Age. However, it was also the only known cinnabar source in Mellaart's time and this provenance is untested.

Unfortunately, proving a specific cinnabar source is very difficult without recourse to detailed isotopic analysis and a wide program of field sampling: a task outside the current remit of this research. However, the rock type of the palette is a close match with those at occurring Sizme, and provides strong supportive evidence for this cinnabar source. Developing this, it would be of interest to take a second look at other stone palettes to see whether the Sizme source is consistently implied, and whether cinnabar has always been used concurrently with ochre, as here in Building 77, or was an earlier or later tradition.

The third material from Building 77 material that required identification was a pure white clay-like deposit (Figure 100). This was found at the base of a plaster-lined vertical bin-like feature (F.3613) which was not thought to have been used for food storage.

This material was identified as "softlime", not a marl but a pliable (when wet) degraded Neogene limestone, occurring some 5km to the east. Softlime was used as the final pure-white coating of the thin multiple-layered wall plasters. So what was this doing at the base of this feature? One very practical use may be that this was a cache of pure white plaster available to make running repairs to walls and plaster fixtures. It seems unlikely that the fastidious Çatalhöyük householders would have tolerated accidental damage to the walls and burial platform areas, especially if this lead to the accidental exposure of paintings. And rather

than wait until the next opportunity to make the 10km round trip for enough softlime to re-plaster the rooms, it would have made sense to have a cache of such material to hand to effect temporary repairs.

Figure 100. Softlime cache at base of bin feature (F.3613), Building 77. Photo Jason Quinlan.

But equally we could consider other uses for this pure white material, uses that leave no trace. For example, it might have been used as a base for medicinal poultices, perhaps in conjunction with cinnabar which has sedative and antiseptic properties. Or for a cosmetic or paint base, to be mixed with organic dyes or iron ochre. While these ideas are not directly testable it is interesting that this material was cached in a plaster-lined structure, a means by which its pure white colour could be protected.

Taking a second look

Other clay-related observations involve a re-inspection of archived material, usually to test some new idea. This year, one such area was the function of miniballs. The question that had been asked was: are the miniballs made of the same type of clay as figurines? To answer this it was decided to take a second look at the Bach miniballs from feature F.758. Building 3 had a lot of figurines and miniballs, so could the latter have been blanks for figurine making?

Using a stereoscopic microscope on site, a quick survey was made of the 800 or so miniballs from the feature F.758, a shallow plaster-lined basin that was adjacent to an oven. Without precise details of the fabrics of the building 3 figurines, it was not possible to directly test the idea that miniballs were figurine blanks. But what did emerge was the wide diversity of materials used for these miniballs (Figure 101). As these are volumetrically smaller than figurines, this diversity would argue against their use as figurine blanks.

The main findings of this short survey are as follows.

1) F.758 miniballs are in fact made from a wide of range of clayey materials, and are not as uniform as previously reported.

2) Most of these have colluvial inclusions, indicating that they were sourced from around the site. Cultural inclusions are typically fine, but many miniballs are centred around single large inclusions, such as bone (Figure 101 (b), or charcoal ((c) and (d)).

3) Many were made from marl (h), sandy marl (e) or from the layer of weathered material forming directly on the marl surface ((f) and (g)).

4) The only non-marl or marl-colluvium miniballs are a brown fine silty variety. These are very uniform, and appear to lack cultural materials.

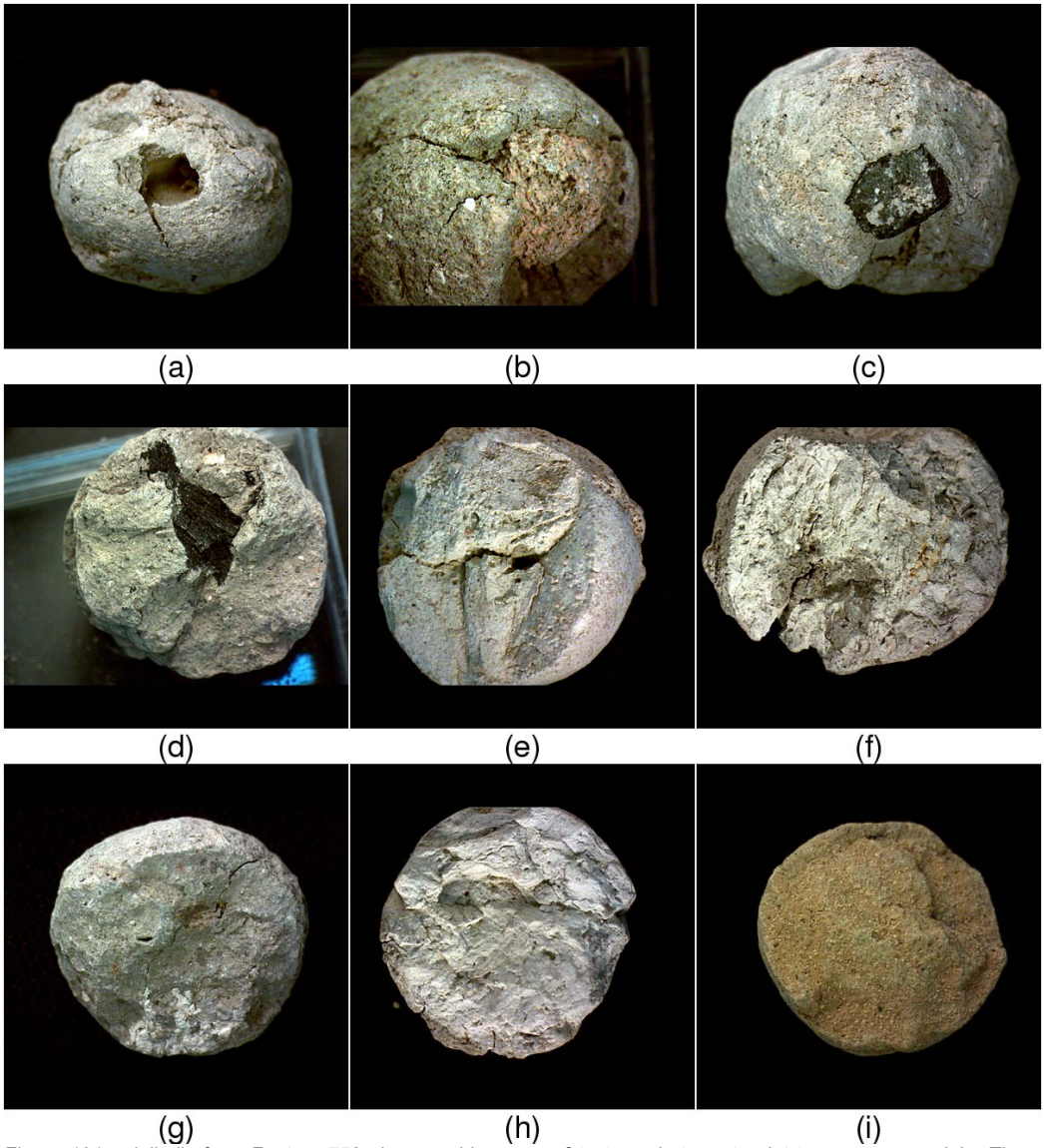

Figure 101. miniballs from Feature 758 show a wide range of textures but most point to a common origin. These miniballs are 1-2cm in diameter. Image Chris Doherty

5) Ornamentation is observed on several mini-balls, in the form of incisions, holes made through the centre, and punctures. In other cases, there is evidence of handling, such as fingerprints and compression marks/deformation. However some apparent transformations are probably unintentional. Some holes do not fully penetrate the miniballs (e.g. ((a)) and originate from the loss of a large inclusion (eg. (c)), rather than a deliberate piercing.

6) With the exception of the silty brown variety, all of these miniball materials have been derived from a marl pit (or pits) which has been infilled with colluvium (e.g. the KOPAL marl pits). For example, the accompanying images record the different levels of such a pit, with a base-to-top sequence of (e) - (h) - (f) - (g) - (d) - (c) + (a)- (b).

7) The brown silty variety is a finely-bedded sediment, either of alluvial or re-worked colluvial origin. Image (i) shows faint linear traces running left-to-right at an inclination of approximately 25 degrees. These are sedimentary/ colluvial laminations, which have been disturbed by shaping this miniball.

8) Critical to understanding the brown silty variety is the occurrence of cultural inclusions. Their absence would suggest the use of silts located beneath the marl (e.g. as seen at in the

KOPAL marl pits), or from contemporary channels upstream (north) of the site. If fine cultural material is present, then this would have to be fine colluvium reworked by streamflow at the base of the mound. So far, no cultural material has been seen, but a detailed scanning electron microscope survey is required to verify this.

9) The raw material of the brown silty miniballs is of particular interest as it closely matches the buff silty mudbricks of the long "history house" sequence of the South Area. The source of clays for these mudbrick clays is still being sought.

10) Other miniballs show a variety of features: some are hollow, other have concentrations of plaster and pigment/ochre, and some are fractured and have gypsum infilling the fractures. Here, gypsum may be post-burial (it is common in the upper levels of the mound), although gypsiferous marl may be natural (this is occasionally seen in pottery fabrics, and is now showing up in some brown plasters).

11) The main miniball type in the F.758 is made from medium-fine colluvium.

12) Some miniballs have clear, soil ped structures. For example the central vertical prismatic shape in (e) is a soil feature, and similar structures can be seen in (f), (g) and (h) - albeit less clearly.

13) Natural mini-ball (and clay ball) pre-forms need steep gradients to form, as this gives both repeated wetting-drying, and downslope movement.

14) The edges of former clay extraction pits would have provided these conditions, particularly if earlier colluvium was being extracted (as indicated by the increasing use of colluvium in mid and late level mudbricks). The fabrics all indicate derivation from colluvium-infilled clay pits.

15) So, tentatively, it is possibly to suggest that changes in mudbrick clay extraction (to the use colluvium that had accumulated in earlier clay pits) combined with the increasing number of old clay pits gradually gave rise to conditions favourable to the formation of natural miniballs in the later levels. As a test, it would be interesting to see whether early miniball fabrics were in also colluvium-free.

16) None of the above informs directly on use or purpose. But the fragility of many miniballs may argue against their use as tokens or gaming pieces.

Clay Beads Archive Report 2011 – Milena Vasić*

*Free Berlin University

The aim of this report is to summarize the work done on the clay beads during the seasons 2010 and 2011. During these two field seasons several objectives relevant to the study of clay beads were established:

1. Estimation of the variability and redefining the typology.
2. Creation of the database in which all beads (even those in arbitrary contexts, or found off site) are to be found as well as their basic information about the physical properties.
3. Carrying out the basic analyses (spatial and temporal distribution) for the Beads chapter in one of the forthcoming volumes (Bains et al, in preparation).

1. A new typology of clay beads was made and in order to avoid confusions with the previous one (Hamilton 1995, Wright 2010), a new code system has been developed. There are 6 main types of the clay beads: "tubular", "lenticular", "sub-spherical", "disc", "other" and "pendant". Lenticular beads are the most common and they can further be divided into 5 different subtypes, according to their sections and their tips. The category of tubular beads contains both barrel and cylindrical beads, while sub-spherical beads (spheroid- shaped beads) can be regular, irregular and with flat parallel faces. The category "other" consists of

all the different types of beads that are not so common and usually have only couple of examples. Pendants are by definition beads that were worn suspended due to the irregular position of the perforation. In addition to this, other artefacts that might have been the centre-piece were also placed in this group.

2. An offline database was created in Microsoft Excel where all beads (even those from the arbitrary contexts or found off site) were recorded. Although clay beads had previously been studied (Hamilton 2005; Wright 2010), the work on the clay bead database did not start until 2010. A total number of 642 clay beads retrieved during the excavations 1995-2010 were entered into the database. Additionally, beads were photographed by Agnieszka Bystron and placed in the Portfolio database.

First of all, the database contains the basic contextual information. As the idea is to incorporate this data into the clay objects database, beads were given an M number. When more than one bead was retrieved from one unit, if these beads were different in shape, colour, size or any other physical property, each bead was assigned with an M number. Consequently, every bead has a unique GID. On the other hand, in the case of the disc beads that are almost identical, they were given the same M number and the quantity of the beads was marked by the category "Count". Previously, some of the clay beads were assigned with an H number. However that has caused a lot of problems in the system as these belong to the figurines. As a result, there was a lot of duplicated GID-s. In order to track the changes, additional field was added in the clay beads database, for recording the changes of the GIDS. That way, both old and new GIDs were recorded, avoiding any further confusion.

Furthermore, the information about the physical properties such as colour of the clay, texture, size and weight information, possible manufacture marks, fragmentation as well as counts were entered.

3. Clay beads are clearly full of information about the type and source of the clay, the technology of the production, function, typology, contexts in which they are found, etc. For the purpose of the following volumes, in this study season, analyses of the spatial and temporal distribution of the beads from the stratified contexts were conducted.

These beads are very rare at the site and they occur in less than 3% of the excavated contexts (excluding the "cut" data category). Although usually a very useful tool, density was not calculated due to their rarity and the enormous volume of the excavated contexts. Therefore, only the presence of the beads was addressed.

Despite the distribution being similar across the excavation areas and the levels, some differences in manufacture, types, use and the deposition do exist. Furthermore, there is a striking pattern when it comes to the deposition. Clay beads are very rarely placed in the burials, which makes the analyses quite difficult. Given that they are seldom found directly associated with the skeletons, it is difficult to be certain whether some of these artefacts were actually worn as beads or pendants.

A detailed analysis needs to be conducted so as to obtain more information about the composition of the clay, manufacture and use of these beads. In order to do so, it is necessary to make experiments to establish the different possibilities of the manufacture and the use of the clay beads. Hopefully, this will be done in the future.

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lithics

West Mound Chipped Stone, Trench 5 - Sonia Ostaptchouk*

*Musée Nationale d'Histoire Naturelle Paris

Concerning the Lithic Technology Study, we continued to work on the question of the nature of the production on Trench 5 and the topic of the economy of raw material.

The material studied in this preliminary report includes the lithic material from secure Chalcolithic contexts (Figure 104) from excavated in Trench 5 in 2011. All the material (as the material from the previous seasons) was counted, weighed and measured and input in the database (Figure 102).

End of season 2009/2010	***Obsidian***	***Others (flint, basalt…)***	***Total***
Count	921	31	***952***
Weight (Grs)	1055	1761,1	
Season 2011			
Count	767	39	***806***
Weight (Grs)	1183,51	890,7	
			TOTAL = 1758 artefacts

Figure 102. Season 2010, T. 5: counting and weighting

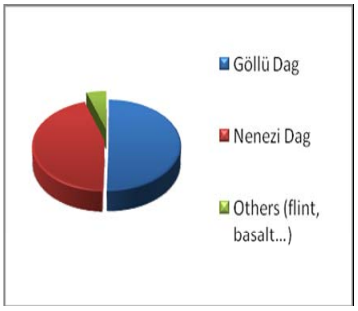

Figure 103. Raw material, season 2011, T.5

The assemblage of the 2011 excavation season confirms the idea and the technological observations of previous seasons (see especially Archive Report 2008, 2009) that the production is mainly oriented toward a production of unipolar blades. We can distinguish two main groups of blades based on the diagnosis of different techniques of production: (a) pressure blades and (b) percussion blades (see Archive Report 2008). And the bipolar production is still absent or anecdotic.
We observe the same homogeneity of the assemblage concerning the technological and economic characteristics of the production but also in the state of surface of the material (except for NOCs (Non-Obsidian Components), see Archive Report 2008, 2009).

Concerning the proportions of the different raw material we notice for the obsidian, as in previous seasons, that the two mains sources (Nenezi Dağ and Göllü Dağ) are more or less represented in the same proportion: 50 % Göllü Dağ, 45 % Nenezi Dağ (Figure 103).
The NOCs stays minor in the assemblage with 5 % for season 2010 (Figure 103).

Chalcolithic secure context - Obsidian-

core (fragment)	2
Blade	**297**
flake	20
esquille	20
debris	28
esquille from bulb	1
tablet	1 + 15 (?)
TOOLS	
retouched blade	**263**
Pièce esquillée	**80**
on blade	19
on core	1
no determined	60
retouched flake	**14**
retouched flake	8
end scraper	3
scraper	2
notched flake	1
pointe	6 + 1 (fgt)
retouched tablet	4
trapeze	1 (?)
burin spall	1

Total =	**755**

Season 2011, Chalcolithic secure contexts -Others raw material-

core	1
flake	3
debris	2
TOOLS	
retouched blade (fragment)	**10**
retouched blade glossy surface (fgt)	**3**
retouched flake	3
pièce esquillée with 2PF	3
burin	1
end-scraper on bladelet	1
end-scraper on flake	1
circular scraper on tabular flint	1

Total =	**29**

Figure 104 Study season 2011, Technological categories obsidian and other raw material

Space and Finds

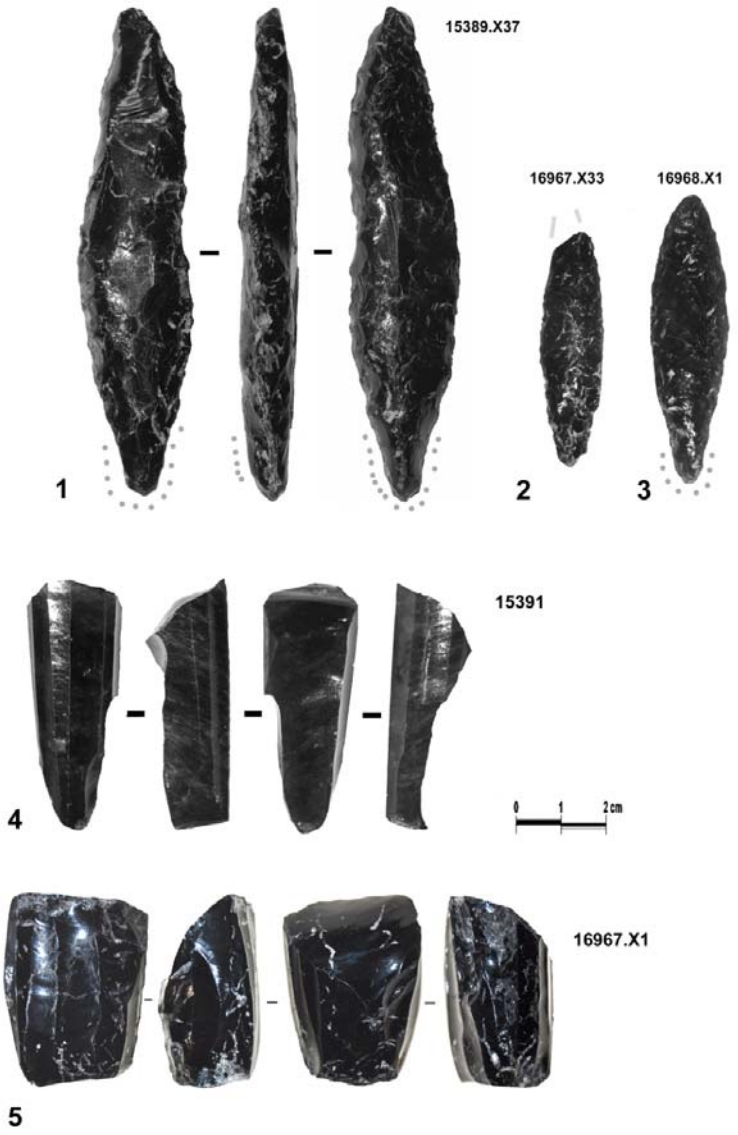

Figure 105. Season 2011, T. 5: 1 and 3: spare points showing usewears at extrimities; 2: pointe without usewear; 4: fragment of pressure core; 5: Core re-used like pièce esquillée. Figure Sonia Ostaptchouk.

Space 340

Two points (Figure 105: 1 & 3) were found this year and show use-wear on the extremities: the largest one was found in space 340 (15389.X37 GID) and a small one in space 345 (16968.X1 GID). They were probably used for drilling work.

This observation could change our hypothesis and we need to consider this type of tool in this context as a projectile point or spear point. The rare points that we discovered on the West Mound look like the type 1 (for the large one) /7 rarely 8 described by Conolly (Conolly, 1999: 40): untangued and unshouldered, generally small size (excepted 15389.X37 GID), bifacial retouched more or less covering. On these two pieces we have the first and clear evidence of the possible use of this tool like a drill. This observation speaks for a different functionality for the same tool type in the Neolithic and the Chalcolithic. In fact, on the East Mound the functional hypothesis is the use as a spear point (Lilian Dogiama's work, *pers. comm*.) whereas on the West Mound, we can envisage different functionalities for the same type of tool functioning as either a spear point or a drill. The use-wear cannot tell us in this case whether the spear points were re-used as a drill.

Space 449

A flat and original flint tool was found together with the hundreds of clay balls in space 449 (15380.X7; Figure 106). The flint's naturally flat faces show natural scars and alteration. These natural scars are partly smoothed by the use as a tool (Figure 106). The retouch shows a circular scraper with glossy edges. The use of this kind of tool could be interpreted as a polishing tool for work with ceramics.

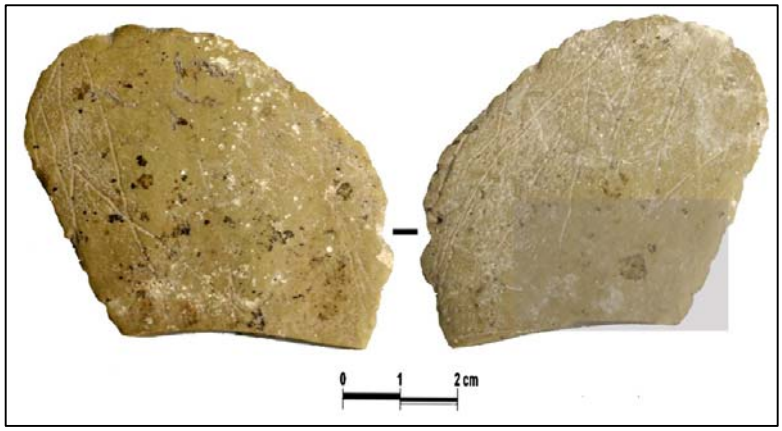

Figure 106. Flint tool 15380.X7. Grey area showing the main glossy surface. Figure Sonia Ostaptchouk

Space 342

In regard to the question of the activities in the different spaces we analysed the use-wear on tools and blades this season. In Space 342, we found some blades with glossy edges. In addition to the glossy flint blades from previous years, at least 3 glossy obsidian blades were found in 2011 (example: 16937.X2 GID). All these elements could be part of sickles and could show the work on soft material (cereals?), but we need to undertake further use-wear analysis to confirm this hypothesis.

Space 454

In this space a point is noticeable but unlike the points mentioned for Space 340 without use-wear (16967.X33 GID). From this space comes also a small core (16967.X1 GID; Figure 105: 5) with some scars showing a first pressure *débitage* and then a bipolar *débitage* of bladelet probably using percussion technique. Unfortunately, we did not find any blank that we could link with this *débitage* (bladelets obtained by percussion). The core was even re-used a third time as *pièce esquillé*e for percussion work. But the most impressive find comes from a large Post-Chalcolithic pit dug into Space 454 was an obsidian bracelet. The surface of the bracelet is fresh, without alteration. The raw material is green transparent. Green obsidian is found at the nearby Nenezi Dağ as well as Nemrut Dağ and the Bingöl region in Eastern Anatolia (Astruc & al., *in press*). Though the same raw material used for the bracelet has been found at Aşıklı Höyük (Astruc & al. *in press*) the type is different: the morphology is simple and the section, with inner diameter around 6-7 mm, is circular.

Outlook

The main objective for 2012 is the infrared analysis of the non-obsidian material (export finds 2011). A separate publication is planned for the obsidian blade production during the Chalcolithic at the Çatalhöyük West Mound. Furthermore, we envision comparing our results with the lithic assemblages from the TP Area. And finally, the results from the West Mound will be contextualized in Ostaptchouk's PhD dissertation on "The Economy of the Raw Material in Central Anatolia during the Chalcolithic".

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SUPPORT TEAMS

Çatalhöyük IT Archive Report 2011 - Sarah Jones

Team: Sarah Jones (Database Officer), Richard May* (Systems setup), David Mackie* & Cordelia Hall* (Survey, Digitisation, GIS), Camilla Mazzucato* (GIS)*

**Çatalhöyük Research Project*

Rich May setup the IT equipment again this year (see Figure 10) and made sure the database and other systems were running before he left. The majority of IT support was carried out by Shahina, Cordelia, Jason, Dave and Camilla as Sarah was unable to be on site for more than 3 weeks due to other commitments.

The majority of work this year comprised of minor database changes required by the lab teams, corrections of bugs and data cleaning. Due to the state of flux within the teams no major development was undertaken. The primary task of the season was to facilitate the teams querying their data to be able to write their reports.

The way the team members have taken on their databases, developed them and learnt how to query them is a real credit to everyone involved.

(left) Figure 107. Sarah & Shahina at work on the project database. Photo Camilla Mazzucato. (right) Figure 108. Dave & Cord checking the site grid control network system. Photo Jason Quinlan.

2011 Conservation Report - Duygu Çamurcuoğlu

Team: Duygu Çamurcuoğlu*, Ashley Morgan Lingle*, Stephanie Black*, Flavia Ravaioli*, Jill Saunders* Sanaz Mehran**

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** Mimar Sinan University

Abstract
Site and artefact conservation was successfully carried out during the 2011 study/excavation season, in collaboration with conservation students from the Institute of Archaeology-UCL and the excavation/laboratory teams. The main activities of the season were the conservation and the maintenance of the buildings in the 4040 and South Areas, block lifting, the conservation of pottery, faunal bone, as well as other small finds.

Research into particular on-site conservation problems were also carried out in order to find more suitable solutions. A meeting took place to discuss the future of conservation at the site, and the UNESCO World Heritage application.

Excavation and treatment of fragile and complex materials

One of the most interesting discoveries of the 2010 season was the "hand painting" which was found on the north wall (F.3094) of Building 77 (Figure 109). Close examination of the hands showed that they were possibly original handprints; with additional painting as some kind of regular brush/tool marks were also visible to the naked eye. This hand print decoration could be considered as the most well preserved painting of the current project so far and therefore it was decided to conserve and investigate further. A red pigment sample taken from the painting was analysed to be red ochre (Camurcuoglu, forthcoming PhD work). In order to preserve the red pigment layer in 2010 season, 5% Paraloid B72 in Acetone/Ethanol was applied on the painted area, in three layers and was temporarily covered and backfilled until the 2011 season (see 2010 Archive Report).

Figure 109. Handprint painting in Building 77, North wall, F3094. Photo Jason Quinlan.

One of the first projects of the 2011 season was to lift the hand painting after peeling the layers of plaster on the bottom part of the wall to investigate if there were more paintings and enabling Building 77 to be further excavated. Prior to the lifting process, the painting was faced up by applying 1.5 % Klucel G (Hydroxypropylcellulose) in pure water with two layers of Japanese tissue (1 finest and 1 medium thickness), one layer of open weave gauze and one layer of cotton scrim in order to protect the painted surface during the lifting process. After the each application, the individual layers were left to dry out for 24 hrs (Figure 110).

Figure 110. The handprint painting before lifting. Photo Jason Quinlan.

When the facing was completely dry, the painted part of the wall was marked out as a rectangular block around 6cm in thickness for cutting (Figure 111). The excavation process was complicating as the painting was situated on the corner of the northeast wall and this created space issues during excavation and lifting (). Since the mudbrick wall was very friable and ready to collapse whilst excavating, it was consolidated by using 25% Primal AC-33 (acrylic dispersion) in pure water as it was excavated. During the excavation process, the ram's head which was right next to the painting was supported by using soil filled bags in order to protect this part of the wall from collapsing (Figure 112). The back was cut first followed by the sides and the base of the wall were excavated to create a square block. When the excavation was almost complete, plastazote supports as well as a rectangular wooden board was used to lift and to support the painting (Figure 113).

Figure 111. The excavation of the painting from behind. Photo Jason Quinlan.

Figure 112. Supporting the ram head and the north wall during lifting. Photo Jason Quinlan.

Finally the lifted painting was placed onto the large, padded wooden board to carry it to the conservation lab (Figure 114). Further conservation work on the wall painting will be undertaken in the 2012 season to prepare it for display.

(left) Figure 113 The handprint painting during lifting. (right) Figure 114. The handprint painting after lifting. () Photos Jason Quinlan.

Conservation and maintenance of the display buildings in the North Shelter and continuation of the experimental capping project.

In the 2011 season the maintenance work of Buildings 5 and B.77 of the North Shelter continued as the unstable environment under the shelter (see 2009 and 2010 Archive reports) had caused more deterioration to the buildings throughout the year. The conservation work undertaken involved the use of lime-based mortars (see 2006 Archive Report) to stabilise cracks and voids in walls and bin structures. The consolidation of plastered walls and other features was made with 10 or 25% Primal AC-33 (acrylic dispersion) in pure water depending on the strength needed. These fills were then painted in using acrylic paints to aesthetically blend the fills. Soil filled bags were placed around areas of the site where undercutting was affecting the structural integrity of Building 51/52, B.59, and Space 242.

Figure 115a. The experimental capping of the South wall F.224 in Building 5 2010 season.

Figure 115b. Experimental capping of the South wall F.224 in Building 5 at the start of the 2011 season.

Figure 115c. Experimental capping of the South wall F.224 in Building 5 at the end of the 2011 season. Photos Jason Quinlan.

As the difficulties with the conservation and control of the environmental levels in the North Shelter continued (see 2010 Archive Report) the experimental capping project was carried out for another season in Building 5 (Figure 115). The plaster layers that were added the previous year on the north wall F.228, wall F.229/Bench F.350, south wall F.224/Niche F.245 were recorded and removed where unstable. The wall capping material was made from locally available earthen plaster (marl) and the capping plaster was created using the same techniques from the previous year (see 2010 Archive Report). The final surface layer was burnished with a smooth stone, as was done with the walls in the experimental house. This year the natural marl was left in it's natural hue and not toned down to aid in highlighting the difference between the original plaster surfaces. Additional bags were placed

around the edges of the cappings to help prevent deterioration from wind damage. Soil filled bags were also placed along the exposed mudbrick on the west wall of Building 5 to slow deterioration.

Figure 116. The handprint paintings in Building 77, North wall, F.3094. Photo Jason Quinlan.

The experimental plasters had primarily survived from the 2010 season; with the exception of the north wall F.228, where the plaster had partially fallen off just before the 2011 season began. When the plaster separates from the mudbrick there is additional surface loss of the mudbrick. On initial examination it appears that despite the surface loss, the capping provides more adequate protection than leaving the mudbrick exposed. A comparison study should be carried out in the 2012 season of the difference between the surface loss with and without the cappings. The success of the capping will be re evaluated in 2012 season.

The two “handprint paintings” on the north wall (F.3094) of Building 77 from the 2010 season was faced and block lifted. Ten additional handprints were discovered along the same wall after the handprints exposed the previous year had been removed (Figure 116). The decision was made to leave this set in situ. In order to preserve the red pigment of the handprints, 5% Paraloid B72 in Acetone was applied on the painted surface. The aim for the following season is to continue peeling the layers of plaster on this wall to see if there is more decoration. The handprints on the north wall were covered and backfilled until the 2012 season. For the backfilling, layers of Japanese tissue and geotextile sheets were placed directly onto the painting, followed by the soft perlite filled bags and then soil filled bags to support the north wall.

Conservation and maintenance of the buildings in the South Shelter

The conservation and maintenance work in the South shelter continued as the excavations progressed. Conservation work focused primarily on Buildings 80 and B.89. While excavation works were not taking place in Building 80 this year (see Building 80 above), a series of spectacular geometric paintings were discovered on the east wall (F.5014), as well as badly deteriorated painted handprints in the burned area on the south wall (F.5038) next to the oven (see Figure 109 & Figure 117). The geometric pattern is particularly interesting because it appears to have been repeated approximately four times over the life time of the wall. During the 2011 season the aim was to expose the top most surface layer of the painting, the other layers will be exposed in following seasons. The pigment was left unconsolidated, and covered with layers of Japanese tissue and a geotextile sheet, followed by the soft perlite filled bags and finally soil filled bags for support. Pigment samples were taken for analysis at University College London. The highest north wall (F.2533) of Building 80 had minimal change over the year and was left supported in order to protect the plastered walls and the related features from collapse (see 2010 Archive Report).

The walls of Building 89 (see Building 89 above) revealed a number of interesting plaster features during excavation, so the walls were regularly checked and conserved in order to

control dehydration. The cracks in the walls were consolidated and grouted. At the end of the season the exposed wall features were covered with layers of Japanese tissue and a geotextile sheet, followed by perlite filled bags and finally soil filled bags for support. The excavation also revealed a plaster feature, which proved to be diagnostically ambiguous. The feature was grouted, faced with 3 layers of Japanese tissue and 3% Klucel G in pure water, and then blocked lifted. The feature was thoroughly documented prior to complete excavation. Red pigment was discovered along the north wall, but was left unexposed and will be further investigated in 2012.

Figure 117. Badly deteriorated handprint pattern on the burnt area of the South wall, F5038 in Building 80. Photo Jason Quinlan.

In Building 79 (see Building 79 above) on the south end of the western wall (F.5013) a painting was discovered, but was badly deteriorated due to fire damage. The figures were recorded and left exposed.

Conservation of small finds

Work on a variety of finds excavated in the field, horn cores, bucrania, and other animal bones, pottery, clay, and a burial basket were undertaken on the site throughout the 2011 season. The backlog from the previous year's was completed during the 2011 season. As previous years, objects such as pottery and complete or diagnostic animal bones were conserved for analysis.

Notes on the future conservation strategies

This season, an important conservation meeting took place on site in order to evaluate and discuss the current conditions of the mudbrick/plastered buildings and features under the shelters, their conservation problems, the success of the past/current conservation treatments as well as the future methods for preparing the site for the World Heritage nomination. The summary of the meeting notes are below:

South Shelter: The replacement of the roof was discussed, as the current roof is affected and yellowed by UV deterioration. Even though it was aimed to have ten years of life when the shelter was first reconstructed, it can only be used for another five years under the current conditions. Possibility of replacing the roof with double-layered polycarbonate, which is resistant to UV is being discussed.

North shelter: The current shelter covering is required to be adjusted for ventilation. Currently the environment created by the shelter is causing problems both for the mudbrick structures as well as the working conditions for archaeologists. Relative humidity (RH) and temperature levels constantly fluctuate in different parts of the shelter, resulting in severe damage on mudbrick and plasters. The environmental conditions need to be stabilised as much as possible by modifying the shelter structure i.e. placing a second skin to enable better ventilation throughout the shelter, keeping the side flaps shut throughout the year. A plan for the monitoring of the environmental conditions in both shelters was discussed and currently being developed. A Hanwell monitoring system with dataloggers will be placed in replica shelters (see Other Activities above) and the data will be collected through these dataloggers by a computer programme for conservators to evaluate during the summer/winter months.

The current use of Primal AC-33 (acrylic dispersion) as a consolidant and the variety of lime based mortars for grouting/mortaring were found successful. Also the results of the experimental capping on the walls of the Building 5 were discussed. The method is still

experimental. It was agreed that future cappings needs to be more porous and thinly applied to act as a poultice.

Recent occurrences of soluble salts seem to be causing problems due to the fluctuating RH levels and it was discussed that they may be deriving from the concrete feet of the shelter, as they are not a normal problem at Çatalhöyük. They need to be identified in order to understand what the nature is and what exactly causes the salt migration through the sediments. Salt samples were taken from the western wall of Building 5 and the cement shelter supports for analysis in the off-season, to help determine if the salt problem in the shelter is naturally occurring in the soil or if it is from the materials used in the construction of the shelter.

Drainage channels will need to be created around the North shelter, since the dampness is a crucial issue. The concrete blocks, which surround the shelters also need to be lined with a material, so that the water does not permeate more than 2-3 cm.

Animal activity is a big problem inside the shelters i.e. birds, spiders, burrowing animals, dogs, foxes etc. and needs to be dealt with in order to protect the buildings from physical damage.

GIS is required to be integrated into the conservation monitoring/recording of the site and the each area needs to be examined, scored and mapped. In this way, it is possible to evaluate different areas by scoring as the conditions change.

Site Management:
It was agreed that the important buildings, features and areas that are fragile, will be conserved and opened for visitors for maximum two years before they will continue to be excavated and researched to provide different experiences for the visitors. It would also be useful if a local team of conservation professionals is organized to ensure a quick conservation and management response in case of emergencies during the winter months. The annual permit for conservation access is an issue in Turkey and it limits the interventions that can be carried out by the conservation team out of season.

The walkways around the excavation areas need to be modified and carefully planned according to the needs of visitors as well as the shelter structures.

Documentation of conservation
Development of the conservation database has continued throughout the season as we collaborated with the Database team and achieved very efficient results. All artefacts were photographed before, during, after treatment and registered to the new image catalogue in order to be linked into the recently developed Çatalhöyük Conservation database.

Acknowledgements
Big thanks to all team members who made 2011 a very successful season.

Heavy Residue Archive Report 2011 - Milena Vasić* & Slobodan Mitrović**

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Due to the fact that we did not produce the archive report for 2010, this report covers both 2010 and 2011 seasons. As these two seasons involved both the study and the excavation season, we had two separate tasks: data analysis for the forthcoming publication and the processing of the HR samples.

Study Season 2010-2011
During the study season, there were several different tasks HR team needed to undertake:

1. Presentations and discussions
First of all, we attended the presentations given by each of the lab teams and excavators in 2010. For the excavation part, we produced the GIS plots for the 5 ubiquitous HR materials (Plant, Bone, Obsidian, Mollusc, Eggshell) for each of the excavated buildings and spaces in order to give the feedback to the excavators. In addition to this, we presented preliminary results of the HR quantification (and a draft of our chapter), which after the cleaning of the database (Heavy Residue Archive report 2009), covered 1960 samples from the 4040 and South Areas.

2. Cleaning and compiling the data
Despite spending a huge amount of time in 2009 on cleaning of the database and choosing the samples (see Heavy Residue Archive report 2009), there were still things to be done in 2010. Although we had the list of correctly compiled samples at the end of the season 2009, the Excavating, GIS and Survey teams worked on the excavation database throughout the year, both on and off-site, so we had to update the relevant context information several times. However, thanks to their hard work, we were able to start with the quantification analysis during the 2010 season.

3. Data analysis and writing up the chapter
The first batch of the quantification analysis was done in 2010. However, majority of analysis were conducted off site, in order to produce the draft for the chapter before the beginning of the 2011 season. As the stratigraphy in the 4040 Area has been changed over the winter, most of the analysis needed to be redone. After the analyses were completed, we went back to the chapter. Due to lack of time, we did not have the chance to finish the chapter whilst on site. However, the new charts were added and text changed accordingly.

HR Processing 2010-2011
During both 2010 and 2011 excavations were on a smaller scale when compared to the previous years. Therefore, we managed to stay on top of things. Nonetheless, majority of the time dedicated to HR processing in 2010 was dealing with the backlog from the previous year. Same thing happened this year. 182 out of 191 samples that were floated in 2010 (Archaeobotany Report 2010), were stored as a backlog (at a different stage of processing, so some were left for sieving, some for sorting, and some for weighing), and finally recorded this year and turned to the Finds Office for further recording and distribution to the labs.

The HR processing took place this year the 2nd of August until the 18th of August. As there were no designated “priority” units to process, we were processing the samples chronologically. With a somewhat smaller team than usual, consisting of 4 sorters (Hatice Yaşlı, Hatice Çelik, Fadimana Sivas and Saliha Sivas), first the backlog from the 2010 was dealt with, and then we started with the 2011 samples. However, due to the lack of time, only 60 samples from 2011 were fully processed. Consequently, a backlog has been created for the next year to process but it will take only several days to do them in the next season. This will not affect the lab. teams, as there is quite a lot of dry-sieved material from 2009 onwards that have not been analysed as it is a part of a new excavation cycle 2009-2018.

HR changes
During this study season, a lot of well known issues and problems in the process of Heavy Residue, from taking the samples on site to the distribution of materials to the specialists, has once again been addressed.

First of all, a lot of changes were made in the HR database by Sarah Jones. First of all two new fields “find GID” and “filter for Unit” were added. So far, searching for a record in the HR database was always a somewhat risky task as it involved using a usual Microsoft Windows find option (ctrl+ f) on the field where the actual information is already entered. That way, it was quite easy to accidentally type in a different unit number (and hence make the mistake) in the HR sheet. Another novelty in the HR database is “delete record” option, a bit dangerous but very useful option. Furthermore, 2 new boxes “problematic” and “merged flot” were added

to the database. The first one is very convenient when it comes to tracing the mistakes and problems and the latter one is used for marking two flots that have been combined (Heavy Residue Archive Report 2009).

Over the years, there has been a lot of discussion about the discrepancies among the databases. For HR, it is problematic, as the category of artefacts can change as the artefact goes from one specialist to another. For instance, a certain artefact gets categorized as Shaped Clay, and after it is recorded as such in the HR database, it is turned to the Finds Lab. The finds officer takes another look at the artefact and may decide that it is actually a fragment of a Clay Figurine. After being recorded as a Clay Figurine and turned to the Figurine team, it can either be entered in the Figurine database as such, or it can be turned to the Finds officer for being just a fragment of a Clay Ball for example. However, so far, HR team was never getting the information about the changes of the categories back, which directly influenced the HR distribution analyses. Learning from the previous study season, where the results of presence and density analysis showed incorrectly high values for figurines (Cessford 2005), in this study season we tried to correct all the clay categories, by copying the information from the specialists` databases. However, as some of the samples contained different clay artefacts, it was impossible to calculate weights, and consequently, the densities of the clay artefacts (HR chapter in the forthcoming publication). It goes without saying that the category Shaped Clay is a very useful when it comes to the contextual analysis and possibly production areas for some of the clay objects (for example figurines). As this database discrepancy directly affects, or rather limits the potential of the HR analysis, we discussed with the other specialists about the possibilities of improving the system.

First of all, it has been decided to slightly change the clay categories in the HR Database (as well as the recording process). So instead of having narrow categories for the clay artefacts, HR will from now on have only 2 categories: Clay Figurine and Shaped Clay. Each fragment of the Clay Figurine should be first checked with the Figurine team just to make sure that it will be recorded in both databases. Under category of “Shaped Clay” goes everything else apart from the clay beads (which go under “beads” category). Additionally, in the field “comments” number of fragments as well as the description should be entered (whether it is a Clay Object, a mini Clay Ball etc). Number of fragments is extremely important, as it would help a lot with tracing those artefacts in case some changes need to be made. With entering additional information, it will be possible to do the analysis on the broader categories but also to keep the information on the different types of clay artefacts. The plan is to go through the material previously collected (from 2009 onwards) and correct all the categories according to the new system.

When it comes to the category “Beads” it would also be very useful to record the counts and the raw material they were made of as well. The same goes for the category of “Worked Bone” and “Worked Stone”. Therefore, it would probably be a good idea to maybe add the field “count” to the database.

Another issue is the Stone from HR. Stone is collected from the 4mm fraction of every sample. It is not weighed, but simply marked that it exists. However, over the years, HR Stone has been piling up in the storage rooms, and there was simply no time to look at it. Some samples do contain fragments of Ground Stone and debris of bead making, but it seems that the majority of it is simply stone (pebbles), that is of no interest to the research. However, due to the quantity of Stone, it is easy to miss those pieces that are important, and in this HR study, we had only 10 fragments of worked stone in 1960 samples, which is hardly accurate. Additionally, other materials end up in stone (for example, bone fragments, flint, obsidian etc), which makes the weights imprecise and the analysis more difficult to conduct. We discussed this with Christina Tsoraki, the new head of the Groundstone team and hopefully, next year, we will be able to solve this problem.

Furthermore, the question of Bone Diagnostic category should also be addressed. The idea is to collect only microfauna from the smaller fractions of HR (2mm and 1mm), but as the sorting team does the job without the microfauna specialist, a large portion of the collected bone is not microfauna, but rather, small fragments of macrofauna. Therefore, it might be better to change the category of “Diagnostic Bone” to Bone 2 mm and 1mm and to introduce a new

category – “microfauna. Nevertheless, this idea has both advantages and disadvantages and it has to be discussed first with the microfauna specialist, Emma Jenkins.

So far, it has been the custom to distribute the material to each of the labs, as soon as they are recorded in the HR database. However, this has caused a lot of problems in the past, as the Finds database must have all the records. Therefore, it has been decided to give all of the HR material to the Finds officer first and then after the recording is finished, to distribute the material. The finds database will pull the information on each of the recorded samples from the HR database, and everything will automatically be placed in a “virtual crate”. That way, specialists will also have an overview of the samples and whether a certain sample has already been processed or not. More important, the work of finds officers will be to some extent simplified, as they won’t have to record every single bag of HR.

Also, another novelty in the system is that every time the Finds team get a material back from other specialists that does not belong to them (for example, it is quite common for fragments of shell to end up in a bag with bone), they should bring it back to HR in order to record the changes, alter the weights and so on.

These are some of the ideas that will be implemented next year. By doing so, the system will hopefully be improved and the next batch of samples will contain more information and provide more possibilities for the analyses.

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SITE VISUALISATION & PRESENTATION

Southampton Visualisation Team - Stephanie Moser & Sara Perry

Team Sara Perry and Stephanie Moser, with contributions from Lauren Field-Fidler, Tiffany Soule, Lauren Monks, and Kelly du Rand (University of Southampton) with Ian Kirkpatrick and Graeme Earl

Site Visualisation and Presentation Actions in 2011

The 2011 field season marks Southampton's third year of work at Çatalhöyük, and testifies to our continued investment in long-term, critically-reflective research, as well as the production of various well-tested, short-term experimental outputs. We arrived with a larger team than in previous years (Stephanie Moser, Sara Perry, Ian Kirkpatrick, Graeme Earl, Lauren Field-Fidler, Tiffany Soule, Lauren Monks, and Kelly du Rand), including four undergraduate students who were key contributors to the planning, design and implementation of our visualisation projects and who assisted in some excavation and post-excavation activities with the wider Çatalhöyük team. Our work continues to be broad-based in nature, ranging from creation of public presentation materials to assessment of the conceptual rigour of digital imagery. We are committed to affordable, locally-sourced, community-led and substantively-evaluated outputs—an approach which demands significant coordination and communication time on site and in the local villages and cities.

Site Guidebook

During the 2010 season, our team prepared a full draft, English-language Çatalhöyük guidebook to replace previous out-dated guidebooks and to extend the aesthetic we are applying on the site itself to printed, distributable materials. Prior to our arrival in 2011, Ian K. circulated the draft guide through the Çatalhöyük listserv and, in turn, collected critical comments and revisions from multiple specialists and team leaders. This commentary was integrated into another draft, which was then reviewed at Çatalhöyük by members of the excavation and lab teams. Costs for printing of the guidebook were sourced, and the English version was sent to print (x2000 copies). The Turkish language version is now being reviewed and revised by various team members, and final graphic layout will be completed upon approval of the text.

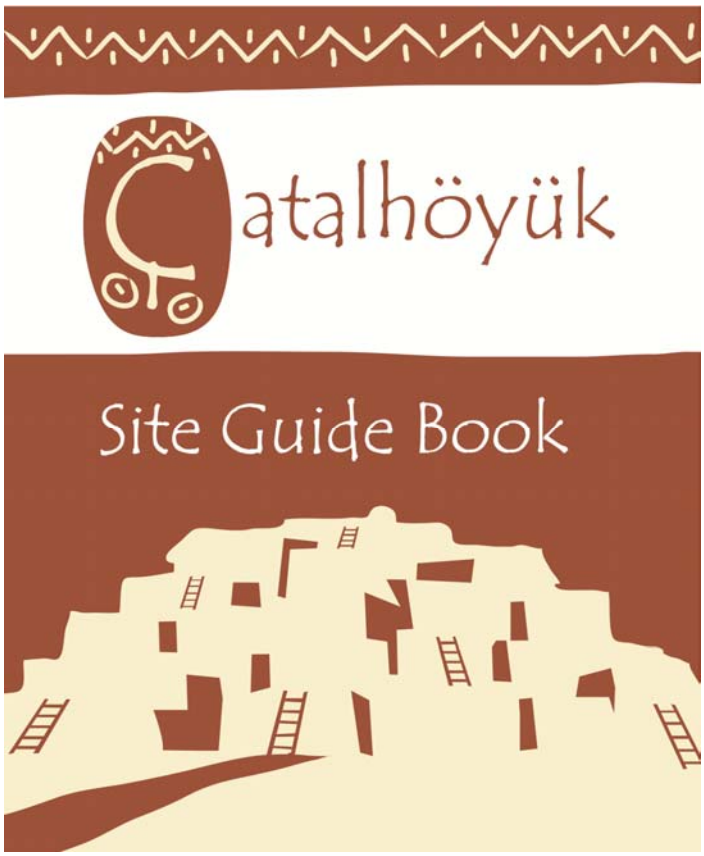

Figure 118. Excerpt from English language edition of Çatalhöyük Site Guide (Prepared by Ian Kirkpatrick)

Visitor and Site Staff Research: Interviews and Critical Feedback

Evaluating and responding to visitor, site guard, staff and community reactions to Çatalhöyük's presentation is central to our intellectual approach. Since 2009 we have invested in a programme of semi-structured interviews facilitated by a Turkish team member (Yildiz Dirmit), recorded via pen-and-paper, and later transcribed into digital notes. Such

interviews are generally accompanied by observations of visitor movement and engagement within the Visitor's Centre and out on the site itself.

This year, guided in part by pre-existing questions and in part by a concern to assess last year's outputs, Lauren F. and Tiffany have worked alongside Yildiz to interview the site guards. These guards are the first—and oftentimes the only—point of contact for the 15,000 people who pass through Çatalhöyük each year: they connect personally with the visitors—touring them through the site, answering questions, and managing interactions with the archaeological remains and the Visitor's Centre. The guards have repeatedly offered us their informed opinions on recent changes to and possible future redevelopment of visualisation at Çatalhöyük. This year's interview programme focussed upon responses to our work from 2010 (including critical assessment of the site leaflet, the site map, and the Visitor's Centre alcove exhibit and entry-way fabric panels), as well as general input on the site signage, site tour, experimental house and Visitor's Centre. Feedback from the guards generally converged, with positive evaluations of the map, the site leaflet (although grammatical errors in the text will necessitate a re-write in the future), the alcoves, the fabric panels, and the overall aesthetic. As echoed in last year's interviews, the Visitor's Centre is regularly critiqued for its excessive displays of text, and the loudness of (and echo in) the space. These are points that we continue to address via our programme of redesign outlined below. There is also evidence from other members of the Çatalhöyük team that the adjacent community of Küçükköy would like to have further presence within the presentation of the site—if only on the site map. In 2009, the pre-existing View from the Village display was refashioned using scarfs produced by Küçükköy women; a decision that has been repeatedly positively appraised.

Visitor's Centre

We continue to apply an approach in the Visitor's Centre that has been developed over the past two field seasons and that, based on our interview programme, seems to have been well-received by both visitors, archaeologists and other site staff. This approach privileges small-scale, carefully-researched, locally-sourced and changeable design strategies and displays above permanent, outsourced, large-scale expositions. In proceeding as such, we are able to constantly experiment with exhibitionary styles, content and layout without fear of concretising the displays. The subsequent year our experiments can then be subjected to evaluation, with their temporary nature thereby enabling us to disassemble and reassemble them in line with this evaluation. Not only does such a strategy allow us to be true to the ever-changing nature of the archaeological excavation itself—updating and revising the materials as new finds and ideas are processed—but it also provides the ideal pedagogical environment, as students have the opportunity to plan and implement temporary exhibits that are later critically assessed by members of the academic and non-academic community. More so, it offers a chance to challenge and rethink museological practice itself.

In total, our work in the Centre cost c. 300 TL, with all materials and additional labour (e.g., carpentry) sourced in Küçükköy and Konya.

Legacy of Çatalhöyük Display

Based on feedback collected since 2009 from both visitors and team members, our major focus this field season has been the removal and replacement of the introductory panels situated on the Visitor's Centre's eastern wall, next to the new site map. The aim has been to experiment with redesigning the textual and visual content of the Centre in a low-budget, non-permanent fashion, using positively-evaluated display strategies implemented in previous seasons. This exhibit is effectively our first full test case, using fabric panels as display boards, and replacing the existing didactic text and decontextualised imagery with narrative-style text (prepared by Lauren Monks) and a variety of different, specific visuals (collated by Kelly du Rand). We are responding here to the demand for adding dimensionality to the exhibition space, for more engaging and less word-focused displays, for more visually-interesting components, for the capacity to easily substitute or alter aspects of the exhibit's composition over time, and for a more gripping introduction to the site which emphasises its international impact and scope, as well as the people and materials behind its fame.

Figure 119. Kelly du Rand preparing one of the panels for the Legacy of Çatalhöyük display. Photo Visualisation Team

Alcove Painting and Children's Materials

In 2010, in response to the state of the two alcoves in the back corners of the Visitor's Centre, we produced a composite display of figurative wall art uncovered from the site, including Turkish and English explanatory text. At the time, we also mocked-up a geometric design for the second alcove, but did not have time to implement it. Upon our return this year, our interview programme indicated that the figurative display was well-received by visitors, thus leading us to feel confident in applying a similar approach to the remaining alcove. Using last year's mock-up as a general guide, and inspired by the unearthing of a new geometric pattern on the east wall of Building 80, Tiffany Soule and Lauren Field-Fidler led the design and painting of a composite pattern of geometric motifs on the second alcove. This was accompanied by two panels each of Turkish and English explanatory text, including an index that allows visitors to trace the context of the motifs back to the original excavated houses. In the future, it is envisioned that the major text panel on art and symbolism at Çatalhöyük (to the right of the alcove) will be replaced and connected thematically to the alcove paintings. Accordingly, a mock design of a title panel for such an exhibit has been prepared.

Linked to the alcove paintings is a larger plan to produce child-friendly displays and to better cater for the substantial number of families visiting the site each year. In this vein, Lauren and Tiffany, guided by the graphic expertise of Ian K., drafted a children's handout, including key facts, two puzzles (a maze and a 'connect-the-dots'), and a colouring page. The intent is to distribute these handouts alongside the site brochure as visitors enter the Centre—an approach suggested and supported by the site guards. The handout has been prepared in black and white, and printed in a run of 300 copies.

Images of Çatalhöyük Portfolio

Given visitor interest in imagery and visual content at the Centre, we have created a small, table-top portfolio showcasing some of the illustrations and digital imagery that have been produced by Çatalhöyük's artists and computer scientists in the last 3 years. Led primarily by

Figure 120. Northwest corner alcove with geometric patterns and text panels

Lauren Monks and Ian Kirkpatrick, this display was intended to replace some of the outdated, free-standing panels in the middle of the Centre, as well as to highlight the novel work of site visualisers—which, ironically, too often goes unseen. The nature of the portfolio is such that content can easily be added to and removed over time to ensure the exhibit does not stagnate. The display also provides the opportunity to underscore the variety and affordances of different forms of visual presentation, and the range of teams producing such imagery.

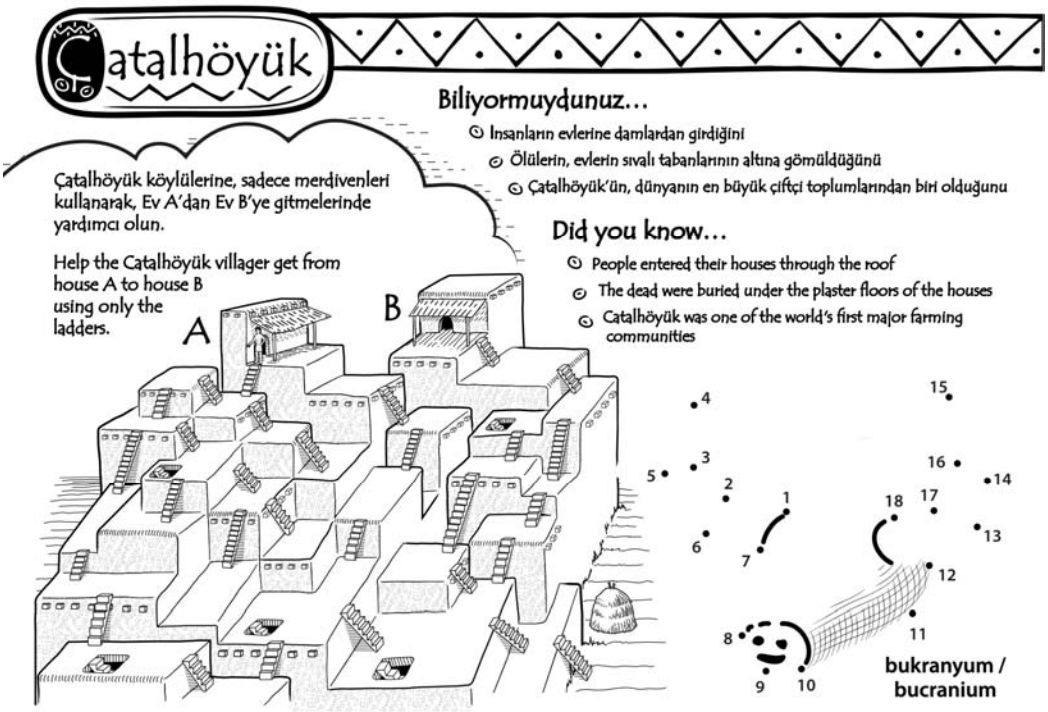

Figure 121. Page 2 of the children's handout (Prepared by Ian Kirkpatrick)

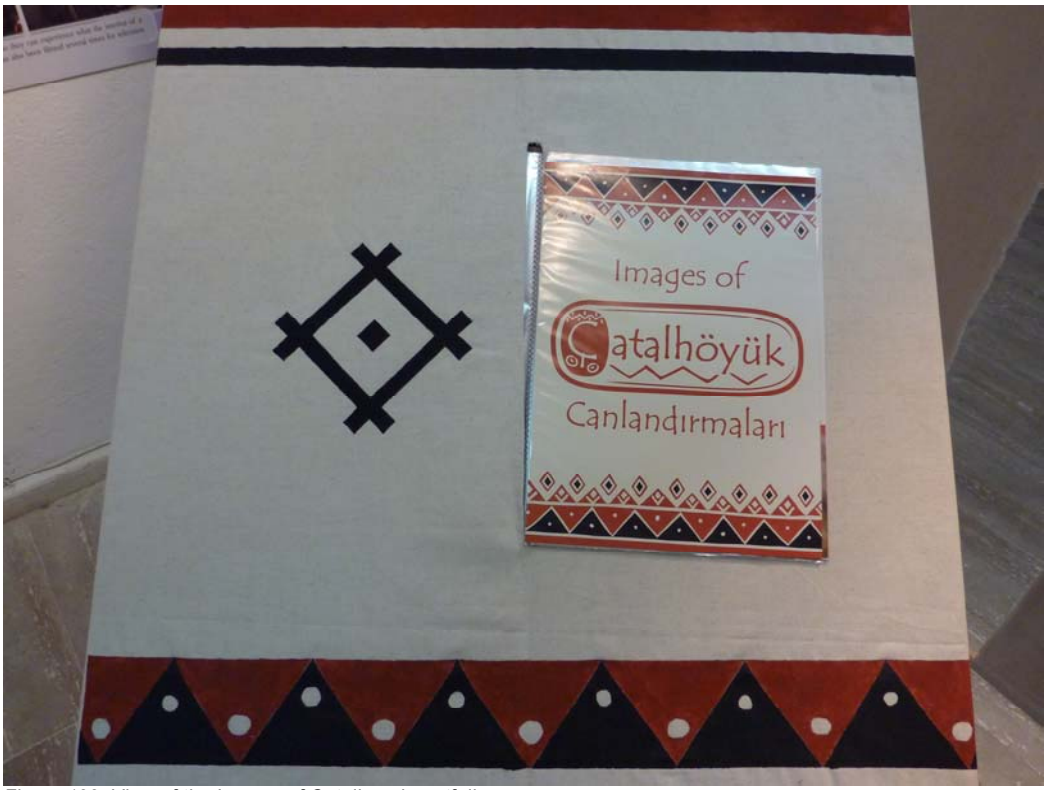

Figure 122. View of the Images of Çatalhöyük portfolio

Entrance Hall

The Visitor's Centre is currently accessed via a short corridor that is buttressed by a security desk and populated with various panels and photographs from previous exhibitions. Given their culling from other sources, these panels and photos are not driven by any cogent

narrative, nor are they aesthetically or structurally consistent. As the corridor represents a visitor's first major induction into the site, we are keen to unify its components and reframe the overall display. To this end, Ian K. and Kelly du Rand have begun to mock up a design for this space whose intent is to convey the sense of awe and inspiration that visitors (and archaeologists alike) often experience when they arrive at Çatalhöyük. The expressive photographs of Jason Quinlan and Scott Haddow provide ideal means to communicate such emotion via their views of the volatile landscape and skyline. We have thus selected a variety of images for potential display in the corridor and will revisit the concept and design next year in consultation with site staff and visitors.

Additional Signage

In an attempt to contextualise various pre-existing displays in the Visitor's Centre, we have begun to produce short panels to accompany unidentified exhibits. Prompted by analysis of visitors' patterns of movement in and engagement with the Centre, Lauren F. and Tiffany—with Ian K.'s graphic expertise—prepared explanatory text to sit adjacent to the reconstruction of Mellaart's Shrine F V I in the south-eastern corner of the room. This reconstruction is arguably the most popular artefact in the Centre, regularly photographed and studied by visitors, yet positioned without any orienting context. Lauren and Tiffany have used the text panel to speak of the significance of the art itself, but also to acknowledge the maker of the reconstruction and hence hint at the genealogy of artists involved in the presentation of Çatalhöyük.

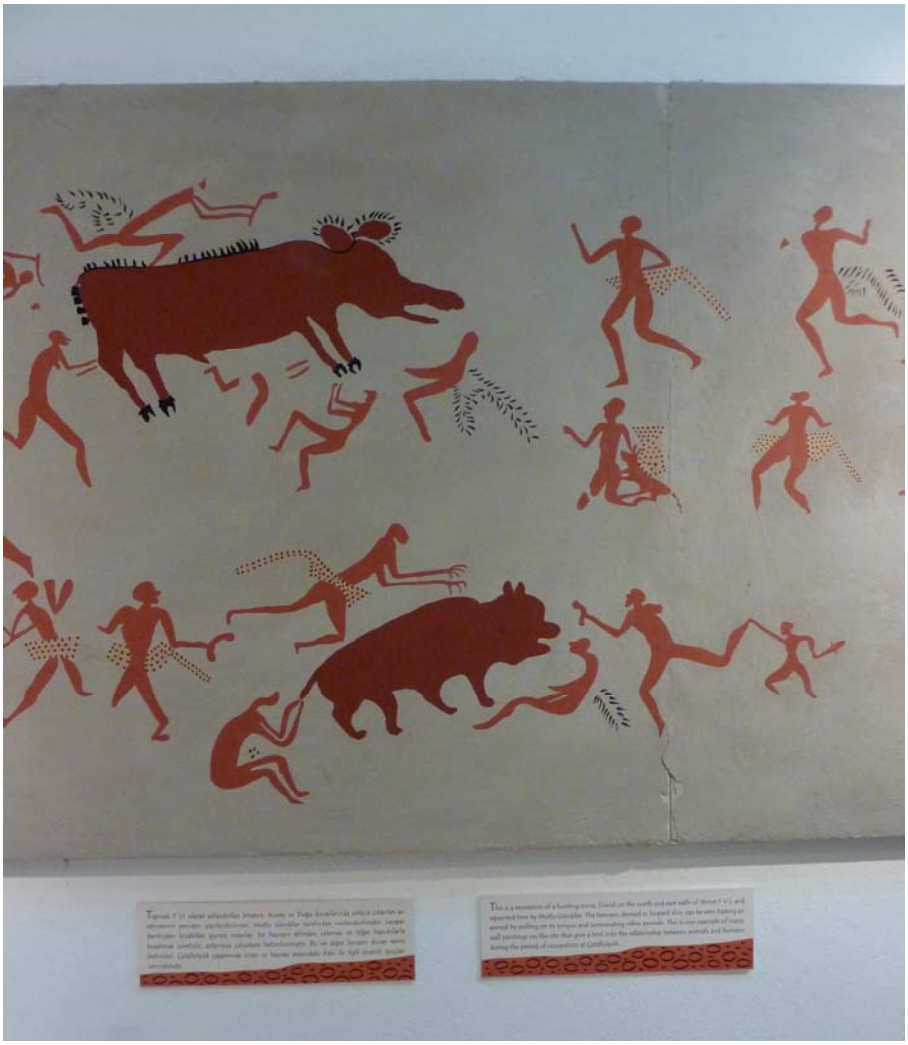

Figure 123. Text panels underlying Mutlu Gündiler's reconstruction of Mellaart's Shrine FVI in the Visitor's Centre

Collation of Visual Resources
A component of each of our field seasons at Çatalhöyük entails the compilation of an organised, contextualised archive of visual materials related to the site—i.e., produced by Çatalhöyük's various illustrators, photographers, archaeologists and other specialists. This archive is not intended to duplicate the vast collection of imagery currently scattered about the Çatalhöyük database; rather, it is meant to stand as a repository of key pictures which speak to the legacy of visual creation on site, and which hint at best practice in visualisation in archaeology.


Figure 124. Lauren M. posing in the experimental house (Photo by Kelly du Rand)

Digital Visualisation and Visual Theory
The critical development and assessment of new imagery—including digital renders—is of prime interest to our team. To this end, the series of computer-based reconstructions of Çatalhöyük's homes (initiated last year by Grant Cox) continues to be the focus of refinement. As such, we are aiming now to collect feedback from the site team on their impressions—both emotive and technical—of the imagery. Part of the concern here is both tracing how the illustrative process may lead to reconsideration of the archaeological record, and understanding the relationship between the illustrator and the archaeologist in articulating visions of the site.

With the intent of continuing to inform new digital reconstructions, our team has been photographing the interior of the experimental house at various times of day. Over the next year, and into the 2012 field season, we also aim to solicit input from site excavators and illustrators on the next iteration of our reconstruction drawings. Of interest is the addition of dynamism to the imagery; in particular, depicting the movement of materials through a typical Çatalhöyük house over the course of the day, as well as transformations and variations in day-to-day living spaces.

Future Designs
On-Site Signage
Looking forward, we are interested to refashion, and add to, signage on the site itself in line with the three years of visitor and staff interviews that we have conducted. These interviews indicate that the extant signs are a key feature of all tours of Çatalhöyük, and are especially important to non-Turkish speaking groups given that the Turkish-speaking site guards rely on them to deliver much of the content of the tour. We would like to experiment with the addition of various panels at the base of the East mound (in association with the experimental house and the start of the guards' tours of the site), as well as at the top of the mound, between the North and South Shelters (which would aim to link the larger landscape around Çatalhöyük to the site itself).

In 2009, we replaced the South shelter signs, but weathering damage means these will have to be redone at some point in the near future and any new signs will need to be produced with greater longevity. The North shelter signage, which predates our team's presence at Çatalhöyük, has faired well in terms of construction, but has been subject to critique given its photo-based nature, which no longer appears true to the archaeology. Mellaart's Shrine 14 mural, which sits along the north wall of the South shelter, is also in poor condition and should be replaced in the coming years. Taken together, then, we are preparing now to put forward a larger proposal on the overhaul of these signs.

Short-term Visitor's Centre planning
As per above, our work in the Visitor's Centre is guided by a specific methodology that emphasises, in the first instance, experimentation, teaching and flexibility. Our aim is to proceed each year with the redesign of one half of each wall, while also responding as necessary to feedback on our previous years' installations. Following from our interview data, we will be looking next to prepare an exhibit on the excavation team and team members' archaeological practices. This material would sit adjacent to the Legacy display, towards the south-east corner of the Centre. As previously outlined, we are also planning to redesign the panel positioned immediately beside the northwest alcove. The intention here is to tie its content on art and symbolism to related existing displays in the Centre.

We began discussions this season with Ayşegül İldeniz of Intel about the possibility of installing an Intel-funded touchscreen unit in the Visitor's Centre. The unit and its digital content would echo a model we have tested at the University of Southampton, but the logistics of funding and maintaining it in the long-term at Çatalhöyük require further discussion.

Acknowledgments
As always, our work has only been made possible with the extended and unconditional support of members of the larger Çatalhöyük team, including many of the excavators, illustrators, other specialists and site staff. In particular, Mustafa, Ibrahim and Hasan have offered conceptual guidance on all aspects of the research, and have enabled installation of our outputs in the Visitor's Centre and elsewhere. Levent has been essential not only in providing feedback on our written documents, but also in sourcing, costing and acquiring materials. Oktay, Yildiz, Numan, Serap and Banu have provided vital translation help, and Yildiz continues to be a key contributor to our long-term programme of ethnographic study. Ian K. is an invaluable part of our team, linked to every aspect of the design and final graphic rendering of our products. We extend our great appreciation to everyone who has offered their assistance and insight—most especially to Shahina.

3D Digging Project, UC Merced - Maurizio Forte

Team Leader: Maurizio Forte*
Research Assistant: Nicolo' Dell'Unto**, Lund University
Fieldwork assistant: Justine Issavi*
Time of Flight Laser scanning & computer vision: Nicolo' Dell'Unto**, Nicola Lercari*, Llonel Onsurez*.
Optical laser scanning: Nicole Sam*
Graphic Documentation: Justine Issavi*

*University of California, Merced
**Lund University

Technologies
Hardware: Laser Scanner Trimble FX, Laser Scanner Nextengine, NVDIA 3D Vision Kit, 3D Camera Fujitsu, StereoProjector ViewSonic, Videocamera Jvc, Digital camera Canon 50D.
Software: Meshlab, Photoscan, Stereoscan, 3D Studio Max, Realworks, Scanstudio HD, Gimp, Autocad
Keywords: 3D archaeology, 3D digging, laser scanning, computer vision, reconstruction, documentation
3D-Digging is a research and educational project born from the collaboration between UC Merced and Stanford University in the Fall 2009. The main goal of the project is the three-dimensional documentation, reconstruction and representation of the process of archaeological excavation by the integrated use of different digital technologies such as: laser scanning, computer vision, photogrammetry, stereo projection and real time rendering/visualization.

2011 Activities and preliminary results
The experience acquired in 2010 was able to address differently the strategy of data recording in 2011. In fact in 2010 timing was a very critical factor in laser scanning during the

archaeological excavation and the use of optical scanners (Minolta 910) was not appropriate for capturing stratigraphy and layers (optical scanners have troubleshooting working outdoor). In addition the accuracy produced by the use of the Minolta scanner, even if very valuable, was even too much (a range of few microns) for the representation of stratigraphic layers. The Minolta 910 in fact, as many other optical scanners, does not work properly in the sunlight, and because of that the use in 2010 was limited under a small surface of 1 sq m under a black tent. However the final models produced in 2010 were very interesting because of the very detailed features represented in the sequence of stratigraphic units and in relation with the sequence of midden layers.

Therefore in 2011 we have opted for an integrated system able to shorten dramatically the phases of post-processing and to allow a daily reconstruction in 3D of all the trench of excavation. It is important in fact to highlight that timing is a crucial factor in relation with the daily need to discuss the results of 3D elaboration and the strategy of excavation.

Differently from 2010, we have adopted two new systems working simultaneously: a new time of phase scanner (Trimble FX) and a combination of camera based software of computer vision and image modeling (Photoscan, stereoscan, Meshlab). The Trimble FX is a time of phase shift able to generate 216000 pt/sec and with a 360 x 270* field of view; it is a very fast and effective scanner with the capacity to generate meshes during the data recording, so that to save time in the phase of post processing. The strategy in the documentation process was to record simultaneously all the layers/units in the sequence of excavation using laser scanning and computer vision. At the end of the season we have generated 8 different models of the phases of excavation by computer vision (3D camera image modelling) and as well by laser scanning. The scheme below shows the principal features and differences between the two systems; laser scanning requires a longer post-processing but it produces higher quality of data. Computer vision allows to have immediate results and to follow the excavation process in 3D day by day (but not with the same geometrical evidence of the laser scanner). The digital workflow used during the excavation was the following:

- Identification of archaeological layers and recognition of shapes and edges.
- Cleaning of the surface (in the case of computer vision applications).
- Registration of targets by total station (so that all the models can be georeferenced with the excavation's grid).
- Digital photo-recording for computer vision.
- Digital photo recording for laser scanning.
- Laser scanning.

Time of Flight Scanner	Computer vision
Accuracy 1 mm (controlled by hardware) More analytical tools	Accuracy 5 mm (depending on photos and alignment)
Time consuming (long and manual post processing)	Fast processing and mainly based on computing power (limited human involvement)
Texture mapping processed separately	Semi-automatic Texture Mapping
Complex 3D Presentation	Easy 3D Presentation
Large scale Data Capturing	Micro Scale Data Capturing
Ideal applications: monuments, structures	Ideal applications: stratigraphy, excavation
Manual registration or by targets	Automatic Registration
Radical Decimation	Moderate Decimation (usability)
Operative in any environmental condition	Limitation by light and environment (camera processing)

The digital workflow for the computer vision processing is based on 1) photos alignment; 2) construction of the geometry (meshes) 3) texturing and ortophoto generation. The accuracy by computer vision measured in 2011 models was around 5 mm.

The use of georeferenced targets on site was implemented for the automatic georeferencing of the 3D models with the excavation grid. In that way all the 3D information recorded during the excavation is perfectly oriented and integrated with all the 2D maps, GIS layers and archeological data.

Ultimately and differently from 2010, the post processing phase was very quick and effective for laser scanning and computer vision. In fact the models recorded with the above mentioned technologies were ready and available for a 3D visualization a few hours after data capturing. The speed of this process has allowed a daily discussion on the interpretation of the archaeological stratigraphy and on 3D spatial relations between layers, structures and phases of excavation. In addition the excavation of an entire building (B.89) has allowed testing the system in one single context so that to produce a 3D multilayered model of stratigraphy related to an entire building.

In addition a 3D model of the painted wall of B.80 was created in 3D computer vision in order to study the relations between micro-layers of frescos and the surface of the wall.

Stereo visualization

The last part of the work was the 3D stereo implementation of the models for the OgreMax viewer in order to display them in stereo projection. For this purpose we have used the DLP Projector Acer H5360 in association with the NVIDIA 3D vision kit and a set of active stereo glasses. The buildings B.77 and B.89 (during the excavation) were implemented for a stereo visualisation in real time (walkthrough, flythrough, rotation, zooming and panning). Thanks to the portability of this system, the stereo projection was available in the seminar room for all the time of excavation.

Conclusions

The 2011 season has permitted to review the entire digital workflow from data capturing to the final documentation and reconstruction process. The integrated use of different technologies of data capturing (computer vision and laser scanning) has generated a more sophisticated pipeline of digital interpretation, thanks to the comparison between models, meshes, geometry and clouds of points. The relevant speed of all the process was able to increase the capacities of interpretation during excavation and, more specifically, to simulate the excavation in 3D from scratch. At the end of the season all the models are ready, usable and georeferenced with all the other archaeological data of excavation.

RESEARCH PROJECTS

Microarchaeology of middens - Lisa-Marie Shillito

University of York

This season was spent integrating the findings from the research into midden micromorphology (Matthews et al. 2004, Shillito 2006), with data from other analyses, and discussing the potential for taking this work further in future seasons. Work on middens from 2004 – 2010, as part of my PhD and subsequently as part of Templeton funded work, is now complete and the detailed findings are published in articles (Shillito 2011a and b, Shillito et al. 2011a and b), and summarised in the forthcoming monographs. It has become increasingly standard in microarchaeology in the past few years to integrate analyses such as inorganic and organic geochemistry, phytoliths, microcharcoal etc with micromorphology (e.g. Karkanas et al. 2008, Cabanes et al. 2010, Matthews 2010, Weiner 2010, Albert et al. in press) to provide both visual and chemical characterisation of deposits; by considering all of this evidence together we can get a more robust picture. It is anticipated that the next phase of research into microarchaeology at Çatalhöyük will strengthen the links between micromorphology and these other disciplines, to provide a multi-proxy approach to understanding formation processes and activities. This research is now referred to as microarchaeology of middens, rather than micromorphology, as we are combining these methods.

Specific projects in progress from 2010 are the multiproxy analysis of ash deposits from midden and non-midden contexts, to investigate whether it is possible to match fine ash layers in middens to deposits from hearths and other contexts, to get a better idea of the specific activities represented in middens, and the cycles of these activities. A set of 80 samples from non-midden ash contexts is in the process of being analysed. Further work using FT-IR, in consultation with Steve Weiner at the Kimmel Centre for Archaeological Science, is also planned, to resolve the debates concerning ash and lime burning deposits. New techniques developed by Weiner's team (Regev et al. 2010) can distinguish between different sources for calcite, where other techniques, including SEM, have difficulty.

Figure 125. Pit (18162). Photo Jason Quinlan

Further work on midden formation processes is in progress, combining micromorphology and geochemical analysis of deposits from Sp. 130 and Sp.319 (Shillito 2009). We are testing the hypothesis that there are surfaces present in this midden sequence, and also that there were periods of exposure in this midden where deposition was not occurring. This has implications for the types of activities that are represented by these deposits. The links between deposition and activities, and the links with associated B.44 will be explored. A further set of block samples was collected from storage from Sp. 132, (18162), a pit deposit (Figure 125), to investigate the function of this pit and as a comparative case study for a possibly different type of midden deposit. It was hypothesised during excavation that this was a laminated floor-like sequence that may relate to storage. This will be tested through micromorphology and geochemical analysis of these deposits.

Organic residue analysis of coprolites - Lisa-Marie Shillito

University of York

Analysis of coprolites at Çatalhöyük was first conducted as part of the investigation into midden formation processes (Matthews et al. 2004, Shillito 2006), as these form significant

components of middens. Work on coprolites from 2004 – 2010, as part of my PhD and subsequently as part of Templeton funded work is now complete, and published (Shillito et al. 2011). A summary of these findings and their relationship to other lines of evidence will be presented in the forthcoming monographs.
Coprolite analysis will now be developed as a separate but related project, as a collaboration with Bristol OGU and York BioArCh, to investigate organic residues, microfossils and parasites from a large sample set as dietary and health indicators. This season a sample set of 40 coprolites were collected from the sample archive, from all excavation areas, to develop an integrated methodology. It is hoped that data from these analyses can be combined with other studies of health and diet to provide both a longer and shorter-term perspective on these issues. Coprolites provide a complementary perspective to macro remains and isotopes, by providing high-resolution snapshots of environment, health and diet. Further samples were also taken from storage from organic residue deposits from burials, in consultation with Lori Hager and Başak Boz. Previous analysis (Shillito et al. 2011) tested the hypothesis that yellow/orange deposits in burials were coprolites. It was found that many of these deposits were not coprolites, but did contain animal and plant lipids. Further samples will be analysed in more details to try and distinguish what these deposits could be and how this might contribute to our understanding of grave goods and burial practises.

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The InterArChive project - Helen Stokes

University of York

The burial sampling at Çatalhöyük has been undertaken as part of the larger, multidisciplinary, ERC funded InterArChive project (http://www.york.ac.uk/archaeology/research/current-projects/interarchive/) which encompasses the Archaeology and Chemistry departments of The University of York, and the Biological and Environmental Sciences department at the University of Stirling. The InterArChive project has been established to investigate the possibility of recovering cultural and environmental information from human inhumations on the macro-, micro-, and nano observational scales, using soil micromorphology, inorganic geochemistry and trace organic geochemical analysis. InterArChive encompasses, where possible, burial material from all time periods, regions and soil types.

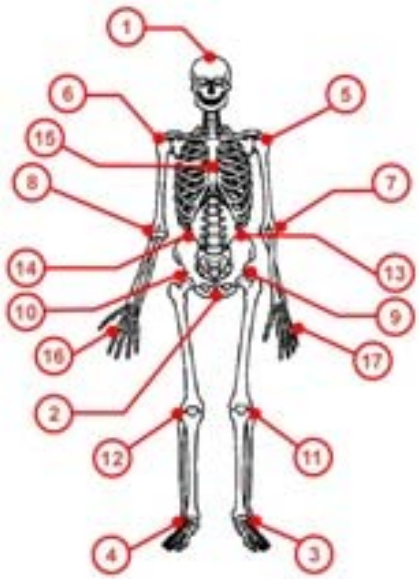

Figure 126. The 17 locations for sample collection

Çatalhöyük is one of the few Neolithic sites that has been sampled for the InterArChive project and as such will be paramount in establishing the viability of the proposed methodology for early prehistoric sites. The samples taken from Çatalhöyük will be analysed using micromorphology (including fluorescence and image analysis), inorganic geochemistry (SEM) and trace organic geochemical analysis (GC/MS and LC/MS). The specific burials which were sampled were burial (15391), an Early Byzantine/Late Roman burial from the West mound, burial (18666), a Neolithic burial from the South mound and burial (19295), a Neolithic severed head from the 4040 Area on the North mound. In the case of burials (15391) and (18666), where possible, micromorphology and bulk pH samples were taken from the area of the feet, pelvis and head. Additional control samples were taken from the upper and lower grave fill and the natural soils. Chemistry samples were taken from seventeen points around the body (Figure 126); head, left and right shoulder, left and right elbow, left and right hand, chest, left and right iliac blade, left and right hip, centre of pelvis, left and right knee, and the left and right foot. Chemistry control samples were also taken from the upper and lower grave fill and the natural soils. The severed head burial (19295) was sampled directly below the head after it had been lifted, taking one micromorphology, one pH sample and one chemistry sample with associated controls.

The burials that were sampled for the InterArChive project will be analysed on an individual level relating the findings to the cultural contexts of the burials, and compared with previous

investigations of burial organic residues that targeted specific 'orange' deposits in burials (Shillito et al. 2011). They will also be compared on an intra site basis where the prehistoric and late Roman/early Byzantine burials will be compared to understand how different burial practices and soil environments have affected degradation and the role of time in that process. The third level of analysis will involve a comparison with other sites sampled for InterArChive over the five years of the project. It is hoped, through this analysis, that we will be able to establish, as a team, an affective sampling strategy for future burials. The InterArChive project will also produce a database of materials indicative of specific burial practices, such as, but not restricted to, those associated with the presence of clothing, grave goods and preburial treatments of the body.

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PhD research in the history of projectile points - Triantafyllia-Eirini (Lilian) Dogiama

PhD Candidate, McMaster University

My PhD research concerns itself with the history of projectile points at the site both synchronically and diachronically with the aim of exploring issues of social identity and the role of hunting in a small-scale agro-pastoral society.

For the purposes of this research I am conducting a detailed study of all projectiles found on the site during the excavation seasons 1995-2012. In 2010 I conducted a pilot study using the 1960s collection in order to familiarise myself with the material at hand and to be able to design a suited methodology.

The summer of 2011 was the first period of proper data collection. My goal for this fieldwork season was to study every projectile found during the 1990s excavation seasons. That goal has been achieved. I studied the material stored in the lithics laboratory on site and at the Konya Archaeological Museum. The assemblage present on site consists of the Etütlük artefacts and the material stored in crates in the lab.

Work at the lithics lab:

I looked at the material chronologically from the earliest levels to the more recent ones. In doing that I went through every bag in the crates that was relevant to the level I was studying at the time, and found all the projectile points (whole and fragments thereof), and all the projectile preforms. On occasion I also studied the blanks (e.g., bidirectional blades).

During my recording I came across some projectiles that were not in the central chipped stone database. After discussing this with Sarah Jones and Lisa Guerre we decided that I was to give them an arbitrary A number which would start from A500 for each unit and create an entry for them in the database. This number however was not written on the artefact itself, only on the label and the bag. Others had an A or X number already, but there was no record of them in the database. I also created an entry for these in the database. In all the entries I made, I filled in the following fields: Bag #, Unit #, A/X #, **Raw Material, Interpretative Category, and Crate Location**. Entering these data was done as much as it was possible, but due to lack of time not for every projectile.

Work at the Konya Archaeological Museum:
The *Envanter* portion of the material, kept at the depots of the Konya Museum, was studied in three days, from August 9 to 11, 2011. I studied 91 artefacts in total from the Envanter years 1994-1999. Every artefact was given a Proj. Number (I did not use any stickers), recorded, and photographed.

aDNA Samples:
Four projectile points found during the 2011 excavation season have been packaged accordingly. These projectiles will be the focus of a smaller component of my research, which examines the use of projectile technology. The artefacts, along with five soil samples for each, are stored in the lithics lab on site. They will be rinsed off in an ultrasonic tank in the 2012 field season and the solutions shipped for aDNA analysis. The analysis will be conducted by Prof. Hendrik Poinar at the aDNA laboratory at McMaster University in Canada. After the projectiles have been rinsed, they will remain at Çatalhöyük to be studied and stored. None of the said artefacts will be exported, and they will not undergo any destructive procedure.

Late Neolithic Architecture Of Çatalhöyük - Marek Z. Barański

Team Poznań

The technical aspects of architecture and construction of late Neolithic Çatalhöyük are investigated in the course of a PhD project, which eventually will be conducted at the Institute of Archaeology at University of Gdańsk (Poland). The main focus of this research, supervised by Prof. Dr hab. Lech Czerniak, is to analyse building techniques and strategies as well as the structural character and quality of the buildings that were unearthed within the upper sequences of East Mound.

In particular, I intend to tackle the following issues: (1) preparation of the building development area with regard to foundation works, (2) technical and structural aspects of the buildings including geometry and strength durability of the mud-brick walls, (3) experimental structural analysis of the mound in terms of its stability and bearing capacity, (4) social context of the architectural and construction process. Despite the fact that the process of designing and erecting mud-brick buildings at Çatalhöyük has long been a subject of intense debate (Mellaart J. 1967; During B. 2000; Hodder I., Cessford C. 2004; Cutting M. 2005), the problems, such as those above, have been relatively weakly recognised. Normally, a multidisciplinary team discussion does not involve architecture in the late Neolithic sequences. One of the main causes of this situation is a small-scale excavation area of the upper sequences (Mellaart J. 1962; Hodder I. 2001). In my opinion another important reason is a questionable archaeological phasing used by James Mellaart resulting in difficulties in analysing and interpreting the architectural remains from the problematic period. Therefore, in terms of spatial organization of the settlement, the theory based on horizontal levels of contemporary buildings seems to be very misleading. Over a dozen of years or so, with the exception of TP Area, very few structures have been considered equivalent to the buildings unearthed in the 1960s within what was labelled by James Mellaart as Levels 0-II (Hodder I. 2001; Czerniak L., Marciiak A. 2011). What if the late Neolithic buildings were built not only at the top of the mound but also in many different places down the slope? Is it still possible to trace them even though they are heavily affected by the post-depositional processes?


Figure 3. (left) Foundation ditch of Sp.327 (TP Photo Archive). Figure 4. (right) Stepped foundation of B.74 (TP Photo Archive).

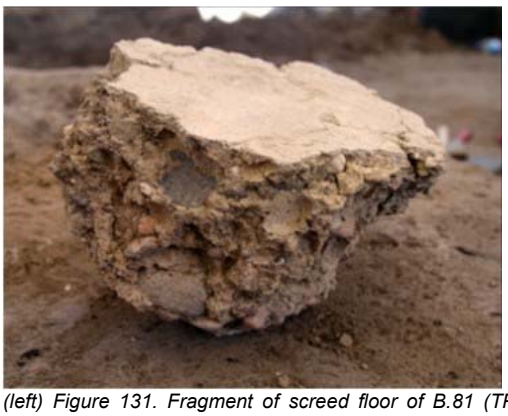

(left) Figure 127. Solid one-brick-thick walls of B.74 (TP Photo Archive).
(right) Figure128. Solid one-brick-thick walls of B.74 bonded with each other (TP Photo Archive).

I believe that the structural analysis might be one of the key factors in chronological identification of architectural elements and features from the upper sequences. It can add another layer of complexity to the history of Çatalhöyük and may represent a valuable contribution to the discussion on the changes in building techniques and strategies as well as on the reasons of the end of the settlement at the turn of the 7th to 6th Millenium. The excavations carried out by Team Poznań that focused upon the latest phases of mound occupation, support the thesis outlined above. There were several buildings dating 6 400 to 5 900 cal BC brought to light within TP Area (Czerniak L., Marciniak A. 2011). In terms of architecture and construction they all varied in comparison to the architectural remains from the lower sequences in a wide range of characteristics (Marciniak A., Czerniak L. 2007).

In the 2011 season, with the help from Shahina Farid and Roddy Regan as well as Peter F. Biehl and Mira Stevanović I carried out an initial research outside of the TP Area to find mud-brick walls and other structural elements that might fit within the frame of a typical TP architectural form. From that point of view I also analysed the archive reports and field drawings of many different teams that had worked at Çatalhöyük in different seasons and times. That was not an easy task to do, partly because, in my opinion, the information included in the database does not allow architectural queries that might be considered efficient enough. For example, it was not possible to trace all the unearthed one-brick-thick walls or screed floors. Therefore, a new sheet category relating to the mud-brick walls might be very useful in all sort of architectural queries. The results of this season's research however are very encouraging. A fair number of solid structures that might be an interesting point of reference for the TP buildings have been traced. It surely gives me more options for a more detailed cross-analysis. The following outline of the comments and remarks on the late Neolithic building sequence can be presented at the present stage of my research, which is based on the TP architectural analysis.

First of all, one of the most striking aspects of the TP architecture is one-brick-thick walls that were bonded with each other (Figure 127 & Figure 128). These solid structures made up of alternating courses of stretchers and headers, which not only delineate the building and / or support its superstructure but also separate many spaces of different character within what seems to be one building or one contemporary building complex. Secondly, the TP mud-bricks in a vast majority of cases are quite uniform in structure and composition. The size of the bricks fluctuated to a very small degree, which might be a sign of ongoing standardisation

of brickwork at the time. This is something that has not appeared to be true at Çatalhöyük (Love S. 2010). Another important structural element that came to light in the TP trench are foundation ditches (Figure 129) that cut through the layers of middens, infills as well as parts of the older structures such as walls, platforms and solid screed floors (Figure 131). In many cases stepped foundations (Figure 130) or layers of consolidation made of mud-brick rubble were observed. As far as the building sequence is concerned most of the TP buildings were built one upon another but in a relatively widely spaced and inconsistent manner. The location of what seemed to be interior as well as open spaces changed within different occupation levels. This is unusual for the buildings from South and 4040 Areas (Hodder I. 2006). Also, in terms of building cubature and the size of covered area, the TP architecture varies in comparison to architectural remains from the lower sequences in a wide range of characteristics. Another important factor are grave chambers (Figure 132 & Figure 133) that in all respects replaced the burials under floors and platforms. The two unearthed structures of that type are good examples of elaborate preparations of the building area and carefully built up and plastered mud-brick walls. There is also an intriguing issue of wall tilting, landslides as well as partial dismantling and reassembling of the buildings.



(left) Figure 131. Fragment of screed floor of B.81 (TP Photo Archive). (right) Figure 132. Grave chamber (Sp.248) (TP Photo Archive).

Figure 133. Grave chamber (Sp.327) (TP Photo Archive).

The initial analysis of TP architecture serves as a good starting point for my research. As I am both an architect and an archaeologist I would like to put the construction process as well as all the other stratigraphic evidence, such as that above, into a broad social context by addressing a number of questions. The first one is: **WHAT?** What impact did the change in building strategies have on a settlement pattern and organisation? What can we say about the building cubature and the size of covered area? What evidence do we have for two-storey buildings as well as possible mud-brick standardisation? What effect might the exceeding of possible maximum bearing capacity of the mound have had? Then comes the question: **WHY?** Why were new solutions for erection of the buildings applied? Why did people put much more effort to make up foundation ditches and set up walls that were a full brick in depth? Why did building complexes appear? The last set of questions starts with the word: **WHO?** Who were the people that built late Neolithic houses? Who lived within a building complex? Many of these goals are to be achieved by the application of CAD / GIS modelling tools as well as other analytical software (Barański M.Z. 2011).

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The Intuitive Builders of Çatalhöyük - Mary Ganis

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Abstract
The paper discusses the built form of Çatalhöyük from the point of view of an architect with her builder's boots on. Firstly, there is a brief discussion about the notion of intuition from the perspective of cognitive psychology. Next, the discussion offers (a) an interpretation of the built form response to the site context and (b) an analysis of the detailed building construction elements. This discussion argues that despite a 9,000 year gap in building traditions, there are fundamental construction principles that might span time to align Çatal building construction methods with similar modern buildings. The use of such fundamental building construction methods may have enabled the successful design and construction of multiple level buildings and urban form of Çatalhöyük.

Introduction
Çatalhöyük is renowned for its dense, multi-level built form that housed a population in the thousands. The question is, why did the builders of Çatalhöyük make apparently enigmatic design and construction decisions. Although this area of investigation has been covered by others from the seminal work of James Mellaart and from the forensic detail through to the large scale by the Çatalhöyük Teams directed by Ian Hodder (1996; 2005; 2007) this paper attempts to glean further evidence of the building rationale within the context and limitations of construction and urban design analytical approaches. The source for this analysis is based on the author's investigation of the on site built forms and communication with team members during the summer archaeological season of August 2011. A justification of the analysis of construction principles used in Çatalhöyük is framed within a possible alignment with a modern example of a similarly scaled building.

The Intuitive Builder

Firstly, consider how traditional building methods may develop from the perspective of cognition. It is proposed here that traditional building knowledge is the result of the repetition and translation of building design and construction over time.

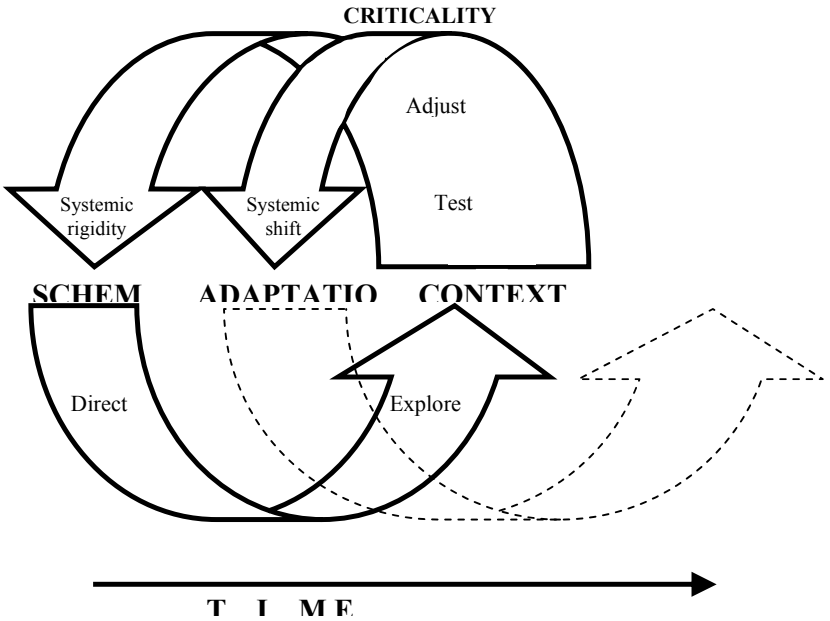


Figure 134 Adaptive Perceptual Cycle (Ganis et al, 2011; based on Neisser, 1976; Portugali, 1996; Bak, 1997; and, Haken and Portugali, 2003).

The proposed Adaptive Perceptual Cycle offers s process that illustrates a cognitive approach to how traditional building ideas may resist or adapt to change over a timeframe that spans Neolithic to Modern humans. It is proposed here that the Adaptive Perceptual Cycle (Figure 134) illustrates how our knowledge structure (or schema) resists, translates or adapts as we experience the world. Our experience of the world and how we act with it is guided by existing expectations (or schemata). As we explore the world information is absorbed from the context (physical, social, cultural etc.) that tests our schema. Contextual information may either confirm our schema or conflict with it. If our schema is no longer a 'good fit' with the context a crisis of relevance occurs and a cognitive choice must be made to either adapt or resist. This is the point of criticality whereby the schema either resists change (systemic rigidity) or adjusts and adapts to the new context (systemic shift). Information that is translated say, from one builder to another may somewhat displace traditional skills, but the core tradition generally remains resilient. Resilience retains the tradition and the new information fits into that schema. If the traditional schema is no longer relevant to a changed context this may trigger a systemic shift or adaptation of the schema to accommodate the new information. It is proposed here that a schema of traditional building methods is translated through trial and error over time and its resilience to a changed context enables the repetition of building methods almost without thinking; in other words, intuitively.

Built Form Response to the Site Context

The Neolithic builders seem to have responded to the advantages and disadvantages of the site's climate, orientation and natural resources. Vernacular buildings everywhere have been developed over time through a process of trial-and-error that eventually become repetitive, traditional building methods the rationale of which may be lost. Despite the possible loss of conscious reasoning behind a building practice the relationship between a builder, building and the characteristics of a site remains. However, this is not to imply some Mazlow-like hierarchical ladder of needs from the physical to self-actualisation. The builder's response to the site was the effect of a level network of many interrelated needs rather than a hierarchical

one (Law, 2003). The design and construction of building form is merely the scope of this particular discussion.

Site Analysis

The site of Çatalhöyük was located in the semi-arid Konya Plain of Turkey surrounded by mountain highlands. In Neolithic times the site offered fertile alluvial soils with the particular advantage of nearby lime-rich clays (marl) oak and juniper forests, reeds and the adjacent Çaraşamba River. Summer was hot and dry, spring was warm and wet and winter was very cold and wet. A lattice of channels inundated the Neolithic Çatalhöyük site during the wet seasons. The Neolithic climate purportedly had higher temperatures than current conditions and supports an inference of higher humidity and a significant wet season. Wind data from the Karapinar area just northeast of the site indicate that winds predominantly prevail from the north-northeast in summer and autumn and strong winds from the south-southwest prevail during the winter and spring (Kuzucuoglu, Parish and Karabiyikoglu, 1998). This brief site analysis provides clues to conjecture a design and construct rationale.

Role of the Prevailing Wind

Wind direction and velocity in the hot, dry summer and cold, wet winter climate may have been a factor in the design of the typical Çatal building. The hot, dry summer afforded rooftop activities with an external fireplace for cooking but typically, a building was designed so that the fireplace-cooking area and rooftop entrance were located along the internal southern wall with the seating/platform generally along the northern wall. The shared location of the fireplace and rooftop entry served a dual function as egress and escape of smoke from the fireplace.

The key factor to a successful fireplace (apart from appropriate fuel) is its 'draw'. Draw is based on Bernoulli's principle: the relatively strong prevailing wind over the rooftop opening of a Çatal building created low pressure so that the high pressure air inside the main room was drawn upwards – the stronger the wind, the less pressure and the stronger the draw. If the main room of the building where cooking, socialising, sleeping and so on took place was smoke filled or if the occupants needed simply to start and maintain a flame or to create air movement for ventilation, they required some basic measures for draw. If there was no chimney to facilitate the essential draw of the fireplace the relationship between wind velocity and direction, the location of the fireplace, the proportions of the room and the rooftop structure become a vital network.

The prevailing summer wind was generally northerly and the fireplace was usually located along the southern wall. This means that the northerly summer wind across the rooftop might draw the smoke directly through the opening above the fireplace (Figure 135(c)). However, in winter the wind came from the opposite direction. These generally southerly winter winds may have foiled the draw, as the smoke would need to traverse the room. However, these winds were particularly strong - for example, in the nearby town of Karapinar wind velocity has been recorded as reaching 100 to 120 km/h (Kuzucuoglu, Parish and Karabiyikoglu, 1998). This strong wind might have created very low pressure over the roof and in accordance with Bernoulli's principle the strength of the draw would be increased proportionally; very low pressure across the roof creating very high pressure in the room which might have facilitated draw in the winter months.

If we assume that the Çatal builders stumbled on Bernoulli's principle then an appropriate structure over the rooftop opening becomes an adjunct to the draw of the fireplace. Various rooftop shelter options have been proposed over the years from a mud brick structure (Figure 135 (a)) to a more lightweight skillion (or lean-to) roof structure (Figure 135 (b)). In the former option, neighbouring walls may have supported a mud brick structure but free standing single skin mud brick walls might have risked collapse - as well as obstructed the through flow of the breeze and diminished the draw of the fireplace. The lightweight skillion roof structure over the rooftop opening was possible but was also likely to impede the prevailing wind and diminish the draw of the fireplace. It is proposed here that a lightweight timber frame, reed, clay and plaster roof may have been constructed as a simply braced shelter structure which would enable breeze flow through to draw smoke, offer shade and a cooling breeze-way

(Figure 135 (c)). Such a breeze-way structure is a similar principle (although at a larger scale) used to facilitate draw in chimney-top design.

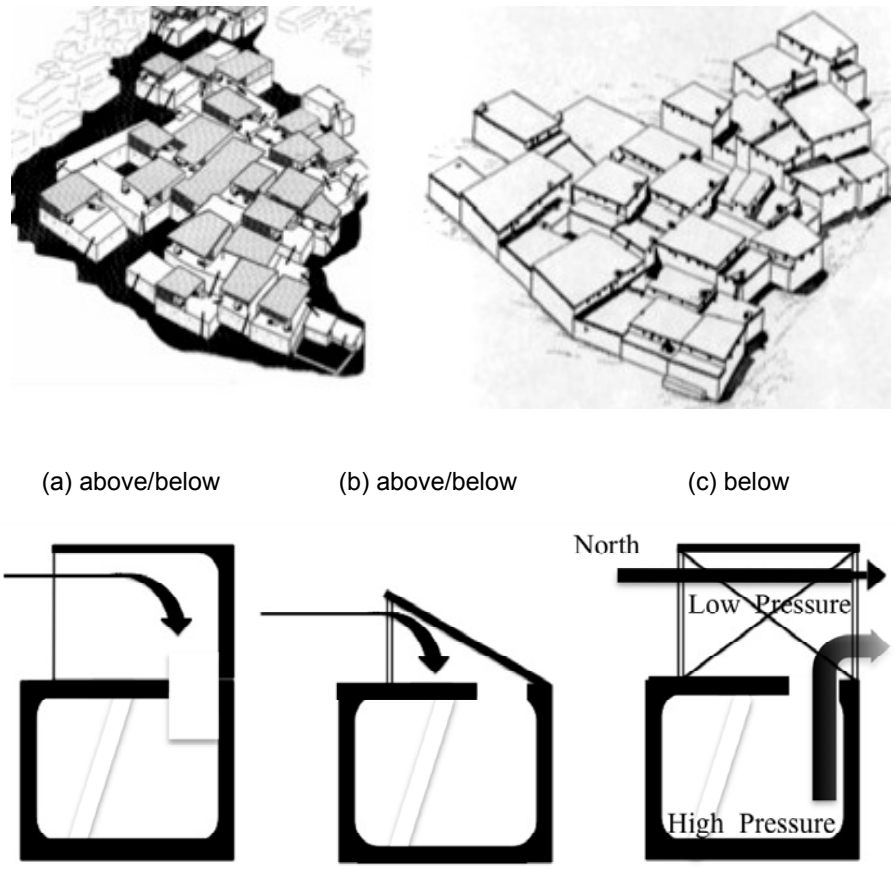


Figure 135. Mounded settlement (above); rooftop shelters and the effect on prevailing wind (below): (a) Cutting (2005); (b) Düring (2000); (c) Proposed breeze-way rooftop shelter structure.

Importantly, the build up of structures over time typically one on top of the other means that the three dimensional urban form of Neolithic Çatalhöyük in any particular timeframe was likely to have a great variety of building heights. Some buildings possibly towered over others and some buildings remained in hollows surrounded on several sides. As such, the prevailing winds may have been interrupted, diverted or obstructed creating wind turbulence particularly where a high building towered over an adjacent low building (as any modern pedestrian of big city streets will attest). It is likely with such variation in height and mass that the wind velocity and direction of various parts of the Çatal mound was affected. If this is so, then the traditional location of the fireplace along the southern wall might have been affected depending on the surrounding built forms. Variations in the microclimate particularly if wind direction was obstructed or redirected may have instigated some of the alternative locations of the network of fireplace, roof top opening and roof top structure.

Light

In addition to the discomfort of smoke, the buildings' only source of daylight appears to have been the rooftop opening as there is currently no evidence of conventional windows. In a simple mud brick construction such evidence may be a timber lintel to support the head of the window opening. Failing such evidence it can be assumed that light would have been an imperative. Bearing in mind that a shelter may have shaded the roof top opening, light penetration into the main room was probably minimal however, reflected light from surrounding walls and buildings could have been intense particularly in summer. The sun's path across the southern sky means that in summer the high zenith of the sun's rays was more or less perpendicular and reflection from the surrounding walls possibly into the main

room was relatively strong. In winter the low zenith of the sun's rays might have penetrated at a more acute angle but be reflected from the white plaster walls and floor.

Thermal Properties
One of the key building resources of the site was the availability of marl (lime rich clay) and clay for making mud bricks. The availability of marl for the plaster finished walls and clay for mud bricks was important for the buildings' thermal properties, enhanced by the clustered urban form. The clustered urban form as it was built up over time would have had all the thermal benefits of modern subterranean structures through the equalisation of diurnal temperature extremes - the building mass absorbs heat slowly retaining a cool internal space during the heat of the day and the absorbed heat is slowly released during the cool of the night.

Building Construction Elements
Vernacular building types usually emerged from an initial response to the site and a way to construct a building in a climatic and landscape context. The climate of the Konya Plain was one of extremes and the availability of mud and marl rather than other building materials instigated a repetitive building tradition imbued with meaningful decoration and practices. The region of Çatalhöyük offered a sustainable source of building materials for mud bricks, mortar, plaster, timber columns and reeds for matting. The availability and quality of these materials along with a cooperative building practice and understanding of the site and its characteristics presented a relationship of factors advantageous to this clustered urban form. This form is not unique to Çatalhöyük but also found at sites that pre-date it and in dissimilar locations. What is of interest here is the structural system that may have facilitated a tower form and the construction details that were used either consciously or intuitively.

Structural System
The possibility of high-rise structures at this site is of particular interest. Firstly, note that the mud bricks were not fired but sun-dried. This means that mud bricks could be moulded to any shape or size. However, unfired mud brick walls were vulnerable to weathering by wind and rain as well as building movement such as settling, expansion and contraction.

Current building practice avoids the use of single skin brick walls because they are vulnerable to lateral pressure; they are easy to push over. Consequently, load-bearing brick walls are usually double and importantly, have engaged piers built into the walls to support the beams for the roof structure or multiple levels. The engaged pier - essentially a thickened part of the double skin brick wall that acts as a column - is integral to the wall and it supports most of the load. Also, the integrated nature of an engaged pier helps to spread the load through the walls.

Generally, a wall acts as an infill panel that braces the building against the forces of torsion particularly for tall, narrow structures. With this principle in mind, consider the typical buildings of Çatalhöyük. The double skin mud brick walls were created by the nearness of adjacent buildings; the small gap between the adjacent walls was in-filled by compacted material forming an integrated mud brick wall. It has been argued that the significant width of the mud bricks had adequate load bearing capacity (Matthews and Farid, 1996; Düring, 2006). This was probable for a single level building, but doubt arises if the building is a tower the footprint of which is generally smaller than its height.

The width of the mud bricks of Çatal was about 200mm to 300mm and of varying length. Current concrete blocks are also 200mm to 300mm in width and about 300mm to 400mm in length, the core of which is hollow. These concrete blocks are used in the construction of high-rise buildings. However, steel rods and the filling of the hollow core of the block with concrete strengthens concrete block work wall construction. The steel rods increase the strength of the wall against the forces of torsion and the concrete core filling increases load-bearing capacity.

The Çatal double mud brick wall may have had load bearing capacity however this alone may not offer the strength to withstand the forces of torsion particularly if the height of the structure

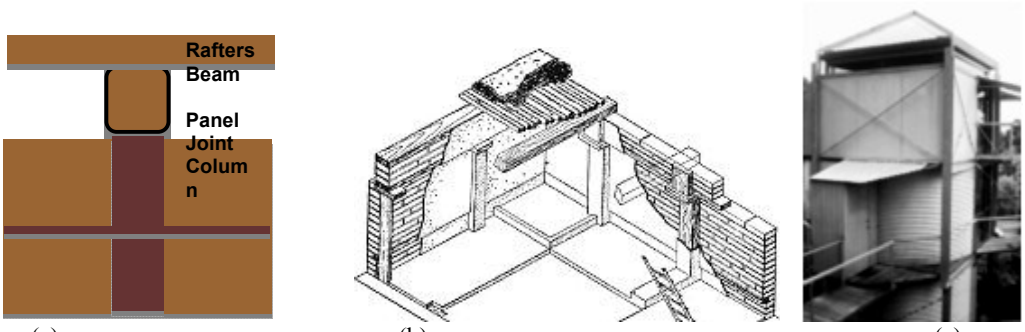
was greater than its footprint; for example, the torsion resisting steel in the structure of a modern high-rise tower allows it to sway in a strong wind rather than collapse.

Interestingly, the Çatal builders were not completely reliant on the mud brick walls to support the roof structure. Timber columns were used to help support the roof beams. The question is, why did they not trust the load bearing capacity of the double mud brick walls to support the roof beams? If not, why did they not build engaged piers to support the roof beams? Engaged piers could have been built with the walls simultaneously and the building process could proceed without the need to fetch, craft and carry timber logs for internal columns. Could it be that the Neolithic builders had an intuitive notion that bricks may be good in compression but timber is not only good in compression but also, much better in tension? Could it be that they realised the vulnerability of relying too much on mud brick walls and mortar of variable quality? Mud brick may be good in compression if the load is spread (as it would be with an engaged pier) but a bending force such as the point load of a beam shatters mud brick. Furthermore, the mud brick walls were held in place only with a rough mortar, which would not be relied upon even using modern materials.

Consider a comparison between a modern steel frame tower and typical Çatal building as a means to explain the forces of torsion and compression that impact on a tall building (Figure 136). Although these two buildings are vastly different in material (steel compared with mud brick) they are both based on a structural system similar to that of a box kite; the parts of the structure that are under tension and compression are similar despite the difference in materials. This comparison serves merely to visually explain those forces.

Both buildings are tall, narrow structures of a similar scale even though the modern one has three levels (each level 3.6m x 3.6m x 2.4m approx.). Both buildings use a braced column support system although the Neolithic building has an internal timber support system while the Modern one has an external steel frame system. The Modern tower has external load bearing columns and cross bracing that counters torsion - the walls are only infill panels and not for support. Indeed, any similarly framed modern high-rise tower will stand without walls. The structural role of the walls and columns is not as distinct in the Neolithic building mostly because the integrity of the materials is a significant unknown: that is, the composition of the mud brick and mortar and the seasoning and size of the timber columns. It is plausible that the Neolithic Çatal builder had through trial-and-error established a rule-of-thumb that often passes for an intuitive sense of structural fitness (as it does for many in the building industry today).

If this is so, then perhaps we may infer a builder's intuitive knowledge of the structural fitness of the load bearing capacity of timber framing for multiple levels, the bracing function of mud brick walls and the load bearing capability and the strength of materials. Nevertheless, despite this conjecture the fundamental principles of Neolithic and Modern buildings appear to align with the compression resisting strut and torsion resisting brace construction of a box kite. The only real difference between them is that the Neolithic building has an internal timber frame braced by mud brick walls and the Modern tower has an external steel frame cross-braced by steel rods.



(a) (b) (c)

Figure 136 Principles of the Structural System: (a) Inferred Mellaart roof beam section; (b) Reconstruction of typical Çatal building Level VI (Mellaart, 1967 in Hodder, 2005); (c) External steel frame tower (Ganis, 1998)

If this is so, the notion that the buildings of Çatalhöyük had multiple levels might be supported. However, multiple levels introduces a significant challenge for the Çatal building for the escape of smoke from the fireplace as well as access to natural light and ventilation. Theoretically from a structural point-of-view a floor above or a mezzanine with a ladder and opening in the floor could be built. The smoke may have been drawn by the strength of the prevailing wind across the towering roof as the increased height of the tower may have acted somewhat like a large-scale chimney flue. But it is most likely that interior spaces were smoky, dark and stuffy.

Footings and Foundation

An intriguing characteristic of the Çatal building process was the demolition of the upper part of the wall of the building and the compaction of this clean fill material (i.e. non-organic) into the cleared, empty space below. Often, the walls of a new building were built as a continuation of the former building with the compacted clean fill material prepared as the new floor. There are many interesting aspects for the impetus of this process from symbolism and memory to an unwavering repetition of building tradition. Here, the focus is on an interpretation of a construction process. From this perspective, such preparation of the foundation and footings for the new building extension would have enabled multiple levels because the old walls that would have had time to settle and stabilise became the new footings and the compacted clean fill offered a cohesive, sound foundation. Nevertheless, there are buildings (for example buildings B.56 and B.65 South Area) that were built on unconsolidated middens. This is an unstable foundation because it probably contained organic material. The south wall slumped and continued to do so despite buttressing (Serena Love 2011, personal communication)

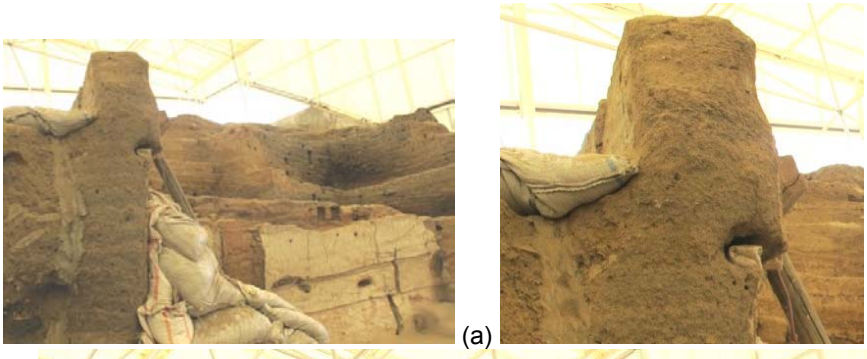
Construction Details

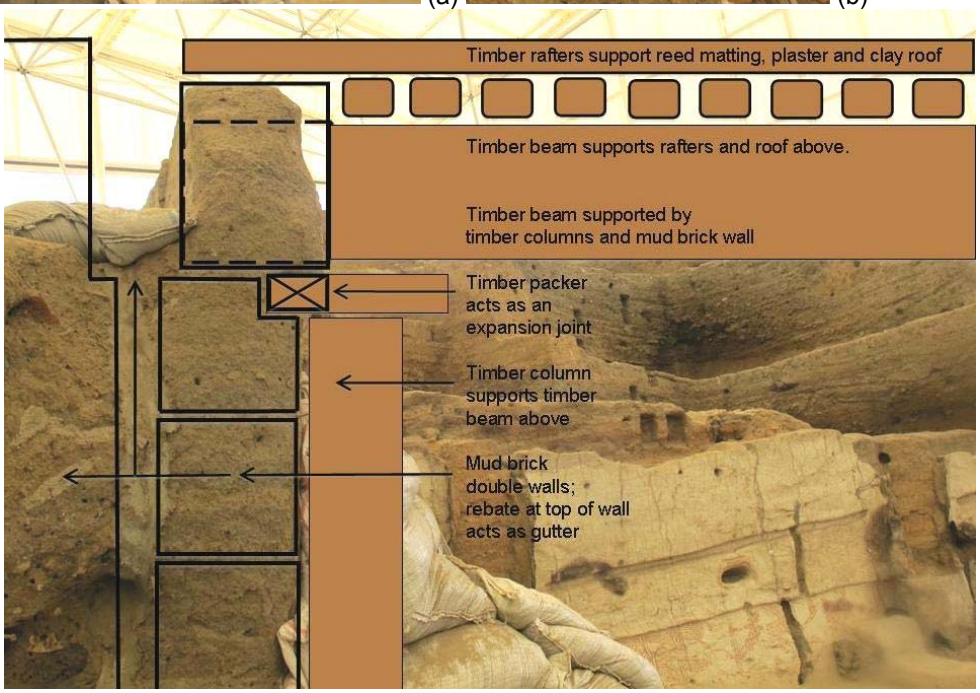
All buildings settle and move. A stable foundation material and footings to support the load of new mud brick walls and timber columns was important. The apparently ritualistic clearing of the vacated building space and the care taken in the compaction of foundation material went some way towards ensuring that any variability in the settling and movement of the new building level would be minimised. The timber columns were embedded in the compacted fill, mud brick walls were built up from the previous walls and finally the interior was coated with several layers of plaster throughout. Nevertheless, building settlement and movement was probable and cracks in the plaster finish of the walls likely.

Joint Details

The plaster finish of the interior of the buildings afforded advantages both aesthetic and functional. Plaster is a relatively pliable material particularly with an initial rough coat of plaster reinforced with organic material applied before a final coat of fine plaster. This plaster finish may have withstood some minor expansion and contraction of the mud brick, however settlement and movement of building walls over time creates stresses and cracks. One principle of architectural detailing is the design of construction details that have a level of tolerance to control the location of potential cracks. Usually, an expansion joint is designed into a wall or large floor span. This expansion joint enables parts of a building to move along a predictable joint. Otherwise, the forces of shear, torsion and so on find release in any weak spots resulting in uncontrolled, random cracks.

With this in mind, consider the proposed typical Çatal building wall section (Figure 137). Based on the in situ evidence it appears that a timber packer was placed on the top of the mud brick wall. This timber packer could have acted as an expansion joint that absorbed the stresses of expansion and contraction of the wall and prevented the likely random cracks that would have occurred without it.





(c)

Figure 137 Building 80 South Site (a) In situ wall section and plaster wall elevation beyond – note the horizontal grooves of the plaster wall finish; (b) In situ detail of top of wall section; (c) Inferred construction detail of double wall section.

Figure 138. Close up of inferred expansion joint; note the crack in the plaster along the internal corner of horizontal groove above the wall painting (Building 80, South Area).

Furthermore, the plaster wall also had horizontal grooves, which effectively were deliberate points of weakness in the plaster finish. It may be that these horizontal grooves that became part of the aesthetic of the interior finish also played a role in the control of cracks by enabling them to form within the grooves, most likely at the internal corners of the groove (Figure 138) rather than risking the development of random cracks across the plaster finish of the uneven wall surface.

However, are all these cracks Neolithic or are they merely the result of 9,000 years of instability and disturbance? Current building practice would expect cracks to form in a plaster wall particularly at the join between say, ceiling and wall and other likely planes of movement. The design of an architectural detail to afford movement tolerances is normal practice; for example, a recess (called a shadow line) is sometimes designed in locations such as at the join of plaster ceilings and walls. Movement is tolerated and random cracks may be avoided or disguised by a line of shadow somewhat similar to the shadow line formed by the horizontal grooves of the Çatal plaster wall. Indeed, many decorative aspects of architectural design are also means of disguising and creating tolerances against the appearance of cracks.

Wall Section

The Mellaart reconstruction (Cutting, 2005) shows the roof beams supported mainly by an upper course of mud bricks. The Mellaart reconstruction of the column and beam support system is structurally curious because the column does not support the timber roof beam directly (Figure 136 (a) and (b)). Rather, the column supports the edge of the stepped upper courses of mud bricks and curiously, a timber panel extends from the top of the column to the underside of the beam. As such this timber panel detail appears to be more decorative than structurally integrated with the timber support system, as it would have had minimal to nil support value.

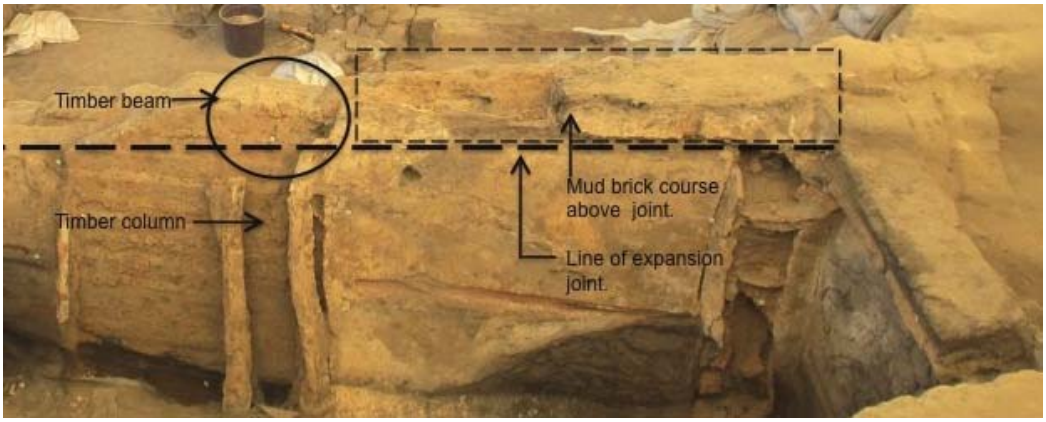


Figure 139 Inferred location of timber beam supported by timber column; and line of proposed expansion joint.

Alternatively, the inferred wall section (Figure 137 and 139) shows the roof beam supported directly by the timber column rather than indirectly as the Mellaart option illustrates. The alternative option enables an integrated timber support structure acting as a connected system – the columns are connected to the beams, which are connected to the rafters that support the roof. Such a connected timber support system has the advantage of a cohesive structural material that can tolerate the forces of compression and torsion in an integrated way. The physical impression of a beam located in situ (Eddisford, 2011, on site communication) appeared to be located above the line of the proposed expansion joint and indicated a direct column and beam support system (Figure 139).

Condensation

The control of condensation, drips and leaks is another focus of architectural detailing. Condensation in a building usually occurs when warm moisture laden air comes into contact with a cool surface such as a wall - the air is cooled and the water vapour changes to water droplets or a film of water on the wall surface. Enclosed building spaces that have minimal ventilation may be subject to surface condensation. Inconveniently, the roof top access

opening of Çatal buildings were very exposed to the weather and any form of closure was unlikely to have been watertight. Consequently, a film of condensation may have formed on the walls of the enclosed spaces of Çatal buildings during warm, wet seasons or cold, wet seasons when there might be a significant difference between the temperature of the enclosed interior space and the outside temperature.

Drip grooves are one of the typical architectural details used to control transient water droplets along a wall. The horizontal grooves found in the interior walls of the typical main rooms could have provided a controlled path for condensation. Water droplets collect along the edges of the grooves rather than randomly streak down the walls (Figure138).

Interestingly, the detail at the top of the wall that consisted of a timber packer and from which sprung the next course of mud bricks was stepped into the interior space (Figure 137 (c)). The reason for this internal step at the top of the wall is conjecture - however, this step in the wall could act as another way to control water droplets that probably penetrated between the roofing material and the top of the wall. Water that may have trickled between the roofing material and the top of the wall was likely to collect at edges such as that provided by this step in the top of the wall. If this is so, then such drips could be limited to the perimeter of the room.

Water and Fire Control

Water and fire control are two of the most important aspects of building design. A Çatal buildings' resistance to fire must have been a significant concern because of the proximity of the internal fireplace and timber framing support structure, timber beams, rafters and reed matting as well as the fireplace on the rooftop which was possibly sheltered by a lightweight timber framed roof structure. Such materials in a densely populated community were highly flammable but this danger was averted by coating layers of clay and plaster on the flammable roofing material. Plaster releases water vapor when exposed to flame and retards the spread of fire. Plaster acts as insulation by retarding the burn of a building's structural system such as the plaster coated timber columns of Çatal buildings. In this way, the plaster coated timber structure under fire would continue to support the roof and avert the risk of early collapse.

Uncontrolled water penetration not only causes physical discomfort to occupants but also degrades the building material. The site was located adjacent a river in Neolithic times and distributed water channels inundated the landscape during the wet season. Clustered buildings only needed to control water run-off from rooftops but the flat roofs were unlikely to offer significant 'fall' to prevent rainwater from ponding on the roof surface. Water was likely to trickle into the building interior below. However, the step in the upper part of the wall section appears to have formed an external rebate in the upper wall and if adjacent a similarly aligned neighbouring wall resulted in a gap between both roofs - as such this configuration may have acted as a gutter for the control of rainwater (Figure 137 (c)).

Maintenance

Building maintenance appears to have been a part of the cycle of activities of these Neolithic people. In particular, the fine layers of plaster coating the internal walls and floor was the most distinctive aesthetic element of Çatal buildings. The internal space was one of constant repair and maintenance due to the degradation by soot and human activity. As has been discussed in detail by others (Matthews, French, Lawrence and Cutler, 2007) several fine layers of plaster coated the walls over the lifetime of a building or generations of occupation. Also, the layers of roofing material might have had a similar or even more frequent maintenance regime as daily wear and tear of pedestrian traffic over the roofs, work and social activities and also constant weathering was likely to diminish the effective integrity of the roof surface.

Unfired mud bricks and mortar are vulnerable to weathering even in a modern context and current mud brick buildings either protect the exposed walls from the elements by awnings or a protective screed similar to the plaster coating typically used by the Çatal builders. Although most external walls were built against their neighbours' walls and so were not exposed to weathering, those walls on the perimeter edge of the mound were significantly exposed to weathering and also required a protective plaster coating as do modern mud brick buildings.

In sum, this overview conjectures a building rationale for Neolithic Çatalhöyük and implies that traditional building practices developed towards fundamental building design and construct principles similar to those in use today. Alternatively, it also might imply that a modern observer (in this case the author) whose knowledge and experience is couched in a particular context tends to interpret evidence from that particular point-of-view and 'fits' her observation into that mental construct (or schema) simply to make sense of it.

Conclusion

The paper attempted to make sense of the typical built forms of Neolithic Çatalhöyük. The discussion was limited to the building design and construction aspects and sought fundamental construction principles that may support the inferred intuitive decisions of the Çatal builders. Firstly, it was proposed that the intuitive builder emerges from the repetition of traditional methods that are resilient to change and became rules-of-thumb. A site analysis set the scene for a discussion about the built form response to the site. The aim was to underpin traditional building design responses with an analysis of the physical site, climate, orientation, prevailing winds and availability of building materials. A rationale for the structural system and the building construction details was proposed with an explanation supported by a modern example. It was proposed that the structural system as explained here supports the notion that the buildings of Neolithic Çatalhöyük could have been built with multiple levels. Apart from the structural support system the construction details discussed here were typical considerations in building design: the thermal properties of a building; the control of cracks resulting from movement and settlement of the building and the expansion and contraction of building material; the control of leaks, condensation; the prevention of fire; and finally, maintenance of building integrity. As such the paper was deliberately limited to building construction at a somewhat intuitive procedural level in an attempt to put oneself in the boots of the Çatal builders.

Acknowledgements

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An Archaeology of the Contemporary: A Standing Buildings Survey of “The Chicken Shed” at Çatalhöyük - Daniel Eddisford & Colleen Morgan

Introduction

The site of Çatalhöyük has been excavated by a multinational team, under the direction of Professor Ian Hodder, since 1993. During this time the site has undergone extensive development; between 1996 and 2003 a large dig house was constructed that incorporates accommodation for the research team, laboratories and office space as well as a visitor centre. A reconstructed, Neolithic-era Çatalhöyük house, known as the experimental house, was built in front of the visitor centre in 1999 (Stevanovic 2003). Two large shelters, built in 2002 and 2007 have been built over the ongoing excavation areas to protect the archaeological remains, and allow them to be put on display year round. In 2009 and 2010, two storage depots were built to house the project’s ever growing archive of artefacts and samples. An older guard’s house was demolished after the 2009 field season, and new accommodation built for the guards, who also lead the guided tours of the site. Finally, a series of other infrastructure and landscaping changes include the improvement of the sanitation on the site with the introduction of grey water recycling capability and the planting and irrigation of a large vegetable garden and orchard behind the dig house.

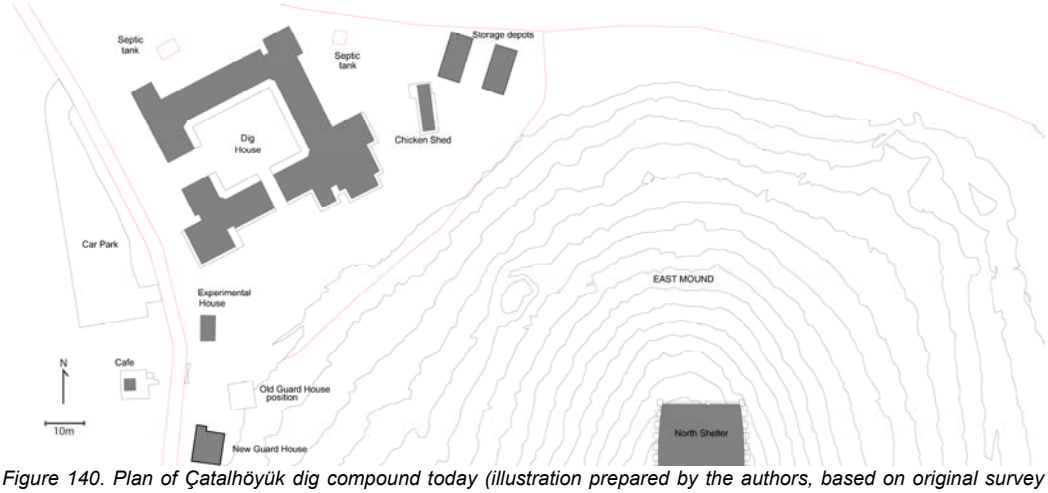


Figure 140. Plan of Çatalhöyük dig compound today (illustration prepared by the authors, based on original survey data produced by C. Hall and D. Mackie)

Between the dig house and the newly constructed storage depots stands a poorly constructed building known to the team as “the chicken shed” (Figure 140). This structure was built quickly and inexpensively in 1995 in order to provide accommodation for the construction workers building the project dig house. The building was intended to be a temporary structure, which would be demolished as soon as the construction was complete. Fifteen years later the building is still in use, although it is threatened with imminent demolition, to make space for a

third storage depot. The building has had a much longer use life than originally intended, and has undergone numerous modifications that have allowed it to fulfil a number of different roles.

We have prepared a standing buildings report on this structure, following the English Heritage (2006) guidelines on historic building recording. English heritage guidelines define a series of levels of building recording, from one to four in increasing detail. These guidelines were designed to ensure certain data standards were applied to architectural recording in England, however we found them equally appropriate for vernacular building recording in this context. The chicken shed was recorded to "level three" (English Heritage 2006, 14), which represents an analytical record consisting of an introductory description followed by a systematic account of the building's origins, development and use. This level of recording was deemed the most appropriate in this instance, given the nature of the building, the role it has played in the Çatalhöyük excavations, and the immanent threat of its destruction. This report includes drawn and photographic records in order to illustrate the building's appearance and structure, and to support an historical analysis.

This report is intended as a permanent record of an otherwise 'invisible' part of the Çatalhöyük research project; a marginal vernacular structure that appears nowhere in the official project publications (Figure 141). We hope to show that this building is in fact an interesting and active part of the excavation's history, contributing to the project's social dynamics and providing insights into possible reinterpretations of the Neolithic architecture on the site.

Figure 141. Overview photo of the chicken shed (Photo Ediisford & Morgan)

Recording Methods

The information contained in this report comes, in the most part, from the examination of the building itself by the authors during the 2011 field season. A scaled floor plan of the building was drawn; a detailed photographic record of the building was made; a narrative description of the current state of the building was undertaken; and evidence of the development of the building, alterations and additions through time, was recorded. The current use of the rooms within the building and the use of the space surrounding the structure was also recorded.

Documentary sources relating to the chicken shed, other than plans of the existing structures, are almost entirely absent; this is largely a reflection of the structure being viewed as of

peripheral importance. Some early photos of the structure were documented, and are included in this report. These early photographs provide an interesting contrast to the formalised documentation of buildings on site, as they are of a personal or artistic nature. Additionally, the photos are exclusively taken by participants of the excavation rather than tourists, journalists, or other visitors to the site; documenting the "back-stage" aspects of the excavation, such as parties or hanging up laundry. The building is almost always referred to by the excavation team as the "chicken shed," however the origin of this name itself is unclear as the building was never used to keep chickens. Rather the name is a reflection of the style of the building, and its poorly constructed nature, in that it resembles a chicken shed. Incidentally, inspiration for the name could have come from the large-scale chicken farms present across the Konya plain, close to the site.

The history of the chicken shed is based almost entirely on informal interviews and discussions with project members, several of whom have been working at the site throughout the building's life. Some attempt has been made to place the construction technique and materials in a wider context with comparisons to other buildings in the area. A more thorough survey of local vernacular buildings and interviews with the builders themselves would have greatly supplemented this report; sadly, the demands of the excavation season precluded this level of attention.

The chicken shed today

Construction

The chicken shed is a rectangular building with external dimensions of 3.70m east-west by 14.00m north-south. The building consists of three rooms, all accessed through separate doors in the western wall (Figure 142). A wooden lean-to area at the northern end of the building appears to have been part of the original construction; more recently a tarpaulin-covered area has been extended to the south of this external area.

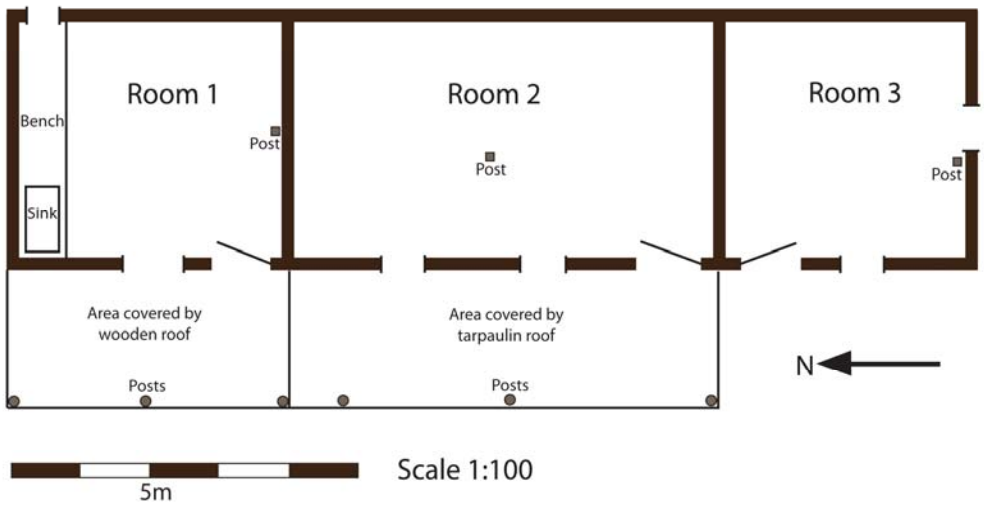


Figure 142. Floor plan of the chicken shed. Plan Eddisford & Morgan

The structure is built directly on a crudely constructed concrete slab that extends in front of the building and provides an area of hard standing. The structure is built out of red tile bricks (tuğla) bonded with grey cement. The tile bricks are laid in offset rows of stretchers, with broken bricks sometimes used to fill irregular gaps. The bricklaying, as with all of the construction, does not appear to have been undertaken by skilled professionals. Equally, functional considerations of the building's design and construction dominate, at the expense of any aesthetic considerations. The exterior of the building is partially rendered at the northern and southern end of the western facade with coarse, white painted cement (Figure 143).

Figure 143. The west facing elevation of the building. The photo was taken in the late 1990s a few years after construction. Photo Çatal Archive.

Two types of tile bricks are used in the construction of the building; both types of bricks have external ridges presumably intended to allow a render to be applied directly to the brick. The northern end of the building (Room 1) is built entirely out of bricks with narrow, closely packed ridges. These bricks measure 278mm by 133mm and are 182mm wide. The rest of the building is constructed using a majority of similar bricks with wider ridges, and a few of the narrow ridge bricks described above. The wider ridged bricks measure 286mm by 134mm (Figure 144). The northern portion of the building (Room 1) abuts the southern rooms (Rooms 2 and 3), suggesting the two phases were built separately. It is possible that the northern room represents an earlier build, with the southern rooms added shortly after. The later construction would have used new, wider ridged bricks, but also utilised the last of the original stock of finer ridged bricks.

The building is covered with a single pitched tiled lean-to roof, which slopes gently from west to east (Figure 145). A pile of unused tiles abandoned at the northern end of the building were manufactured by the Ozkiremit company, based in Çorum (located to the northeast of Ankara) (Figures 146 and 147).

Wooden beams (or top plates) run along the top of the eastern and western walls (Figures 148 and 149). These beams support the western ends of the rafters, which are exposed at the eaves.

A central roof support, consisting of separate wooden beams in each of the three rooms, acts as a purlin and prevents the roof sagging (Figure 150). Like the top plates this beam rests directly on top of the end walls of the building. (Figure 151). The central roof support is also held up by vertical timbers in the northern (Room 1) and southern (Room 3) rooms, and in the central room by a centrally

Figure 144. Different brick types.

Figure 145. Tile roof looking northeast.

Figure 146. Unused roof tiles abandoned at north end of the building.

Figure 147. Close up of unused roof tiles. Photos Eddisford & Morgan.

braced post that resembles a king post in both form and function (Figures 152 & 153).

Soft wood rafters, measuring 100mm by 45mm, span the building at c.540mm intervals. These support a planked roof, directly onto which red terra cotta tiles are fixed. The tiles measure 47mm by 23mm and are 20mm thick (see Figure 147). None of the timber framing of the building is jointed, but merely crudely nailed together.

Two aluminium chimneys at the southern end of the building, in Room 2 and Room 3, would have originally been connected to wood burning stoves in these spaces. The stoves, and lower flues, are no longer present. The need for heating in the building suggests it was originally occupied in the cooler winter months, when temperatures often drop below freezing and snow is common.

In front of the building a wooden lean-to type structure consists of three uprights and sloping cross beams that tie into the roof of the main building. A wooden roof provides a shaded area in front of the northern room (Room 1). To the south of this a lightweight wooden frame has been added, covered with tarpaulin and fabric in order to create a shaded area in font of the central room (Room 2) (Figure 154).

Figure 148. Wooden top beam running along the east wall.

Figure 149. Exposed rafters at eaves.

Figure 150. Timbers forming central roof support

Figure 151. External end of central roof support.. Photos Eddisford & Morgan.

Windows

The windows of the chicken shed consist of low-quality softwood frames and side hinged casements with glazed panels, subdivided by muntins. Several of the glass panels are missing. The frames were apparently built on site and individually designed for each window. The window sashes were likely purchased locally as finished items. The window of the northern room, Room 1, has had security bars added to the outside of it. All the windows have concert window sills (Figures 155 & 156).

Doors

Each room in the chicken shed has its own door in the western wall and no rooms connect directly to each other. The square head wood framed doorways containing simple, vertically planked doors, probably built on site to the individual dimensions of each doorframe (Figures 157 - 158).

Room 1: Northern Room

The northernmost room measures 3.35m north-south by 3.78m east-west; the floor is the concrete foundation slab. The room is accessed through a door in the western wall and the wooden door frame sits on a concrete sill. To the north of the doorway a barred window measures 0.90m wide and 1.38m high. A smaller window in the eastern wall measures 0.47m wide and 0.59m high and is located near the ceiling. A concrete shelf runs along the entire length of the northern wall at 0.85m above the ground and is 0.67m wide. The concrete shelf

is supported at either end by concrete blocks and in the centre by a brick post. A metal sink is set into the western end of the shelf with running water. A large wooden bank of shelves has been built against the eastern wall of the room. The coursing of the bricks suggests that this room was built first, and its internal fittings suggest it was built as a kitchen.

Room one is currently used for storage and is the least currently used of the three rooms in the building. The large sugar sacks used to take dirt samples for flotation are stored on the concrete shelves. Other infrequently used large items such as spools of wire and plastic sheeting are stored in this room (Figure 160).

Figure 152. Central post in Room 2

Figure 153. Vertical post for central roof support in Room 3

Room 2: Central Room

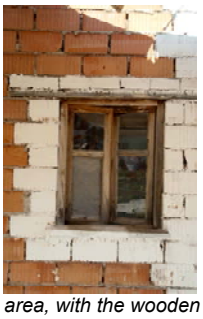
The central room in the building measures 6.00m north-south by 3.30m east-west. The room is accessible by a door located in the southwest corner of the room. The door has a wooden sill. The western wall also has two windows; the northernmost measuring 0.68m wide by 0.84m high, the southernmost window measures 0.66m wide by 0.87m high. Again, this irregularity in window sizes suggests that the windows may have been purpose built on site. On the outside of the building directly above the entrance to Room 2, is hung a cow skull and above this is an external light.

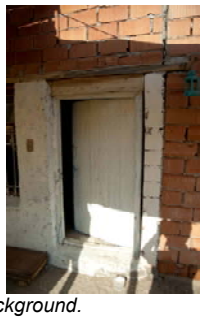
The internal layout of the room varies throughout the season, though some aspects are more constant. In the northeast corner is a refrigerator; there is a set of wire shelves in the northwest corner, and a table at the northern end of the room that is used for a variety of functions. A fan is normally located against the northern wall. Seating in the room is flexible, consisting of a variety of metal chairs, normally arranged along the western wall and homemade low sofas along the eastern and southern walls.

A dartboard hangs on the southern wall. The eastern wall is decorated with a palimpsest of paintings and graffiti added by the team throughout the years (Figure 161)

Room 3: Southern Room

The southern room measures 3.43m north-south by 3.27m east-west and is accessed by a door in the northwest corner of the room. The western wall also has a window in it, measuring 0.66m wide by 0.87m high. A second window in the southern wall measures 0.66m wide by 0.88m high.





(from left to right) Figure 154. Covered external area, with the wooden roofed area in the background. Figure 155. Side hinged casement window in Room 2. Figure 156. Later addition of security bars to Room 1. Figure 157. Square head wood framed doorway with planked door into Room 1. Photos Eddisford & Morgan.

The room is currently used for storage of excavation equipment that is used on a daily basis. Planning frames hang on the northern wall and larger hand tools on the western wall. Crates containing finds bag are arranged along the northern wall and sample bags in the southeast corner. A variety of excavation tools are stored in the central and southern area of the room (Figure 162).

Figures 158 and 159. Door latches. Photos Eddisford & Morgan

Area around the Chicken Shed

A lean-to structure against the western side of the chicken shed provides a shaded seating area (Figure 163). A bench is built into the northern end of this lean-to, providing seating and an area that is used for napping. The lean-to was constructed out of a mixture of recycled and salvaged materials including wood originally used as construction framing for the new depots, tarpaulin which used to cover the excavation areas prior to the construction of a permanent shelter, and material from the umbrellas used to shade exposed trenches onsite. The seating in this area is flexible; however a simple wooden table built by the team members is permanently located here.

Figure 160. Fittings in Room 1. Photos Eddisford & Morgan

Directly to the west of the lean-to area a piece of planked flooring originally part of the Building 5 viewing platform has been repurposed as a dance floor and measures 3m by 4m. Between the chicken shed and the main dig house hangs a permanent washing line with metal uprights set in concrete, where the team members and cleaning staff hang laundry out to dry.

Figure 161. Room 2 in use as a bar. Photos Eddisford & Morgan

The southern end of the chicken shed is used as a storage area, with storage spilling out from room Three. Larger tools are stored here including wheelbarrows, which are leaned against the building. To the east of the chicken shed a large amount of wood is stored which is used for shuttering for the ongoing construction projects on site. This wood is also occasionally used as firewood by team members.

Located between the chicken shed and the main building is a large fire pit with two low wooden benches consisting of long planks propped up on cinderblocks. Prior to the conversion of room two into a recreation area, this fire pit was the focus of evening activities on site. In recent years, most activity has moved inside the chicken shed, but there are still small fires built on most weekends (Thursday nights).

A series of informal dirt paths give access to the chicken shed; the main thoroughfare leads to the kitchen and the seminar room to the west and to the finds depots to the east.

A brief history of the chicken shed

Construction and initial use

There are almost no written records relating to the chicken shed, no original plans or planning applications, and little documentation of its use. The site archive and curated personal photos

contain a number of photos of the structure, in which it is usually an accidental backdrop to other activities. The main source of information on the building is the oral history recounted by the excavation staff and the site guards. It is the memories of the site guards Mustafa, Ibrahim and Hasan, and formerly Sadrettin who have lived at Çatalhöyük year round for many years along with field director Shahina Farid that provide the most detailed accounts of the building's history.

Figure 162. Room 3 used for storage Area around the Chicken Shed. *Photos Eddisford & Morgan*

The chicken shed was built in 1995 to provide accommodation for the construction workers building the project dig house. A small southern section of the dig house, including the current computer room was built first. During the construction of this first dig house building the workmen had constructed a wooden shack, directly to the north of the main entrance into the museum. Little more than a covered area, this provided shade and an area for the workmen to cook. As construction on the project dig house continued the workmen built themselves a temporary structure to live in, which became known as the chicken shed. No mention was made of whether the building was constructed in two phases, but is not unreasonable to think that the northern room, which acted as a kitchen, was built first.

During the 1995 season the excavation team lived in Çumra, a town 10 kilometres away from site. However, in the 1996 season the dig team moved into dighouse and used the chicken shed as additional dormitories. The construction work on the dig house occurred in the autumn and was not conducted during the excavation season, and therefore the chicken shed was not in use. The chicken shed was used as accommodation by the excavation team again in the 1997 season (Figure 164).

The only written description of the construction workers comes from Sadrettin Dural's (2006) memoirs of his time as a Catalhoyuk site guard. "The builders were really nice people. One of them was from Trabzon and had one younger and two older builders to help him."

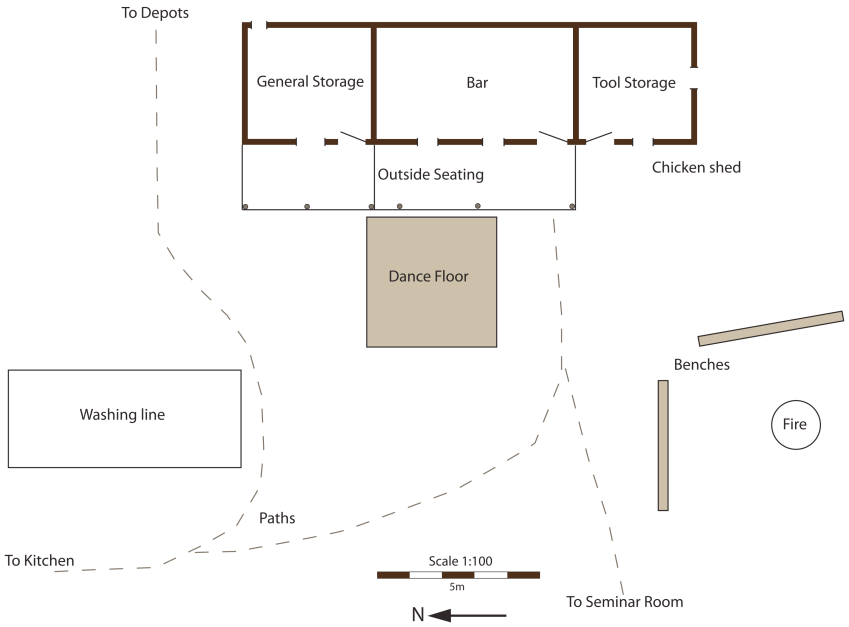


Figure 163. Activity areas around the Chicken Shed. Plan Eddisford & Morgan



(from left to right) Figure 164. Room 3 in use as a dormitory for excavation team. Figure 165. Chicken Shed decorated with Neolithic motifs. Figure 166. Ian Hodder opening the garden. Photos Eddisford & Morgan

Use as an official project building

After the dig house was finished, the builders vacated the chicken shed. Long time site excavator Roddy Regan lived in the chicken shed at this time and recalled it as not a pleasant place to live, and as "a hot place to be." Once finished, the newly built dig house sleeping quarters could accommodate all of the excavation participants at that time and the beds were moved into the newly built dormitories. As the project grew in numbers pressure grew on the sleeping accommodation, which quickly became insufficient. Additional sleeping space was created by allowing people to sleep in tents in the area to the west of the dig house. Following a donation by a new age religious group, the camping area, initially a roughly ploughed area, was improved by planting an orchard, trees around the edge of the site to provide privacy and shade, as well as a vegetable garden.

Figure 167. The Chicken Shed garden. Photos Eddisford & Morgan

The crowded dormitories and lack of personal space meant that at times the chicken shed was reclaimed as a bedroom or the spaces were partially cleared and used as recreation space. However, the building was never again formally considered to be appropriate living quarters. The building was dirty and decrepit, but more importantly it was now used as an official project storage area. As the excavation continued, the team expanded in size, and the amount of excavated artefacts increased in number. Finds storage became an issue, and the chicken shed was reused as a storage depot. During the winter the finds were stored in the research laboratories, and the chicken shed was used to store field equipment for the Konya Basin Palaeoenvironments Project (KOPAL). At the beginning of each season the survey equipment was moved out and the laboratories emptied of finds crates, which were in turn moved into the chicken shed for the excavation season. This use of the chicken shed as finds storage is reflected in the architecture; there were bars installed over the window of Room 1 that remain to date. Although the chicken shed was now being used for more "legitimate" site storage the area between the chicken shed and the main dig house remained an area for parties, focused around a fire in the centre of this space. Often the outside of the chicken shed would get decorated to reflect party themes, for example incorporating decorative elements from the Neolithic buildings being excavated on site or made to look like a prison (Figure 165).

Bucrania and hand prints similar to those found in Building 77 or B.49 adorn the outside of the chicken shed near the lean-to seating area. During the long season in 1999, during which archaeologists lived on site for 6 months, the team grew a garden outside the chicken shed complete with paths, a gazebo and a water feature. This garden predated the larger, more functional kitchen garden to the north of the main living accommodation by many years, and the design incorporated elements of an English garden, reflecting the origins of many members of the team (Figures 166 & 167).

In 2009 the first purpose built finds depot was finished. The chicken shed therefore became vacant, no longer needed to store finds or equipment. At the beginning of the 2009 season the middle room (Room 2) in the chicken shed was cleaned out, painted, and was turned into a social area for the project members. For many years the team members would socialise on the veranda outside the bedrooms and laboratories, the roof terrace above the seminar room, or behind the dig house around a bonfire. The first two areas created a continuous noise problem for other members of the team who wanted to work late or go to bed early; fires were usually only lit once per week due to a lack of fuel. The project provided the paint and materials required to remodel the chicken shed, helped obtain furniture for the new recreation space, and organised for electricity to be wired into the building. During the winter of 2009 the dig house kitchen was remodelled and a door opening onto the external area to the east of the dig house was added. This made access to the chicken shed from within the dig house compound easier. By encouraging people to use the chicken shed for recreation, as opposed to the veranda and the courtyard, the noise problems in the overcrowded accommodation were greatly reduced.

Figure 168. The Chicken Shed decorated as a bar. Photos Eddisford & Morgan.

In the time since it was repurposed as public space the chicken shed has become the central feature of site recreation activities, and the interior was modified and embellished accordingly. At the close of the season in the summer of 2011, the chicken shed had decorations that made it appear to be both a cruise ship and a tiki bar (Figure 168). Among the decorations were a necklace made out of beer caps, a cow skull, a dartboard, graffiti from departing team members along with more permanent fixtures—a DJ table, storage racks, handmade cushions and a refrigerator.

The episodic reoccupation and re-appropriation of the chicken shed remains a defining element of this multipurpose building. Even after 2009, when the chicken shed became primarily an area to socialise, it has been used in a number of other ways. The field archaeologists would congregate there to mull over recent finds, ponder site interpretations or discuss publication details. It has been the venue for informal seminar discussions (Figure 169) and is still occasional utilised for more formal research tasks during work hours, such as a brief transformation into an x-ray laboratory to examine teeth (Figure 170).

Figure 169. The Chicken Shed being used as a venue for informal seminars. Figure 170. Room 2 in use as use as osteology work space. Photos Eddisford & Morgan.

The future for the chicken shed

The future of the chicken shed is uncertain; the structure was originally scheduled for demolition following the 2010 excavation season. The continued expansion of the project has created the need for more formal storage areas, and a new storage depot will be constructed on the site currently occupied by the chicken shed. The only reason the demolition did not

occur was a lack of funding to complete the planned new structure. In addition to finds storage, the new building will incorporate a purpose-built recreation space for the team.

One of the primary goals of this report is to preserve by record the physical nature and some of the history associated with what is now the oldest modern building on the site. A secondary goal is to make visible a rarely-discussed aspect of an otherwise exhaustively recorded enterprise – the archaeological excavations at Çatalhöyük. The study of the use of architecture and space in archaeological dig houses, while secondary to the primary research goals of an excavation, remains an oral tradition on even the most reflexive of excavations. Recording the chicken shed at Çatalhöyük allowed us to consider the history of the site and the reuse of buildings as well as reconsider the social space we live and work in while conducting research on the lifeways of people in the past.

Though the chicken shed may be demolished at any time, there is a record of this building in the archive and in Second Life. Second Life is an online building platform that was used to virtually recreate Çatalhöyük Neolithic occupation alongside research buildings (Morgan, 2009). While many of these buildings are unfinished, the chicken shed was one of the first finished modern buildings, and is complete with a fire and a dance floor. This virtual reconstruction is also threatened; the ever increasing costs of maintaining an online presence in Second Life has made the project unsustainable in the long term. Still, the centrality of the chicken shed to modern social life at Çatalhöyük was evident even in a virtual world; at the end of most online tours of the site most of the participants gathered around the virtual fire to discuss their day's experiences (Figure 171).

Figure 171. The Chicken Shed reconstructed in Second Life. Image Colleen Morgan

Discussion

The chicken shed has been a largely unseen element of the excavation architecture, which has been around for almost of the entirety of the present phase of excavation on the site. During this time it has been used intensively, repeatedly, and in a variety of different ways for different purposes.

The episodic reoccupation and re-appropriation of the chicken shed reflects its status as what Stewart Brand terms a "low road building". "Low Road buildings are low-visibility, low-rent, no-style, high-turnover" (Brand 1995: 24); they are easily customisable and their low status means they can be altered with great east and without protest. Most of the modern buildings at Çatalhöyük are function-built and are off-limits for team members to personalise.

Additionally, many of the spaces segregate the team members by specialty, such as the 'Human Bone Lab,' 'Finds,' and 'Conservation.' While many of the team members are happy to socialise within their own speciality, many other members find that the casual conversation and collaboration in the shared and arguably neutral space of the chicken shed is vital to providing broader perspectives to their work. This recalls Carolyn Hamilton's ethnographic work on the "devices built into the Çatalhöyük project to facilitate interaction and reflexivity," which she termed as including excavation diaries, film recording, the project database, and specialist tours of the excavation (2000: 120). She also noted a number of what she termed "faultlines" with each of these devices, with an emphasis on the tensions between lab specialists and excavators (ibid: 124). The chicken shed, an informal gathering area for socialising and relaxing, is a major catalyst of interaction and reflexivity on site. When an archaeological project grows beyond the scope of causal socialisation between team members, having a 'place of their own' for team members adds to the comfort and creative potential on site.

A purpose built recreation area will likely soon replace the chicken shed. It is unlikely that this structure will be a similar, "low road" building that is modifiable according to purpose. There is very little literature regarding archaeological dig houses, yet what Stewart Brand has written about the value of these modifiable spaces to research projects and scientific collaboration holds true for the chicken shed—that low road buildings can be "peculiarly liberating" places that encourage creativity and new perspectives.

The modifiable nature of the chicken shed also recalls the Neolithic architecture on site; the people of Çatalhöyük were constantly cutting, rebuilding, remodelling and destroying the features and the architecture in their buildings - the field archaeologists encounter and record such instances every day of the field season. Thinking about the chicken shed and its place in the social realm of a research project has introduced new questions regarding this reused, adapted architecture. Are the Neolithic buildings static "history houses" (Hodder 2010) or ongoing projects, modified and re-purposed with mud, plaster and fresh coats of red paint? The Neolithic houses on the site are continually rebuilt over earlier houses, but it is possible that the sacred nature of these buildings is not a reflection of this monumentality, but is the result of their inhabitants' ability to remodel and reinterpret their intimate and everyday environment.

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Seeing Through Walls: Sub-surface terahertz imaging at Çatalhöyük – Gillian Walker & Bianca Jackson

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Dr. J. B. Jackson, Mr J. Labaune, Prof. G. Mourou. Institut de la Lumière Extrême (ILE) at ENSTA-Ecole Polytechnique and Dr. Michel Menu, Laboratories of the Centre for Research and Restoration of the Museums of France (LC2RMF). Dr. W. Matthews, School of Human and Environmental Sciences, Department of Archaeology, University of Reading

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Terahertz radiation is able to penetrate optically opaque material such as plaster up to a depth of approximately 10 mm (Jackson et al 2008). Ultrafast pulses of terahertz radiation are reflected from paint layers which may be present within the plaster, thus identifying their presence. The technique is being investigated as a tool for the reconstruction of images of sub-surface paintings. It is a non-contact, non-invasive, non-heating imaging technique and will have no consequence on subsequent dating of archaeological material.

Analysis of plaster sequences exported from Çatalhöyük using terahertz radiation showed the presence of sub-surface reflections from paint layers within the plaster section (Walker et al 2011). Data was collected using an off-axis reflection method from samples of wall plaster from the 4040 area, Space 455, East wall F 3008, Unit (16080). A deconvolution algorithm was designed to extract the shape of the incident reflected pulse from the reflected data signal and reveal the internal structure of the wall plaster which caused the reflection. Figure 172 shows a line scan of deconvolved data which represents the internal structure of the plaster with a clear indication of a sub-surface paint layer.

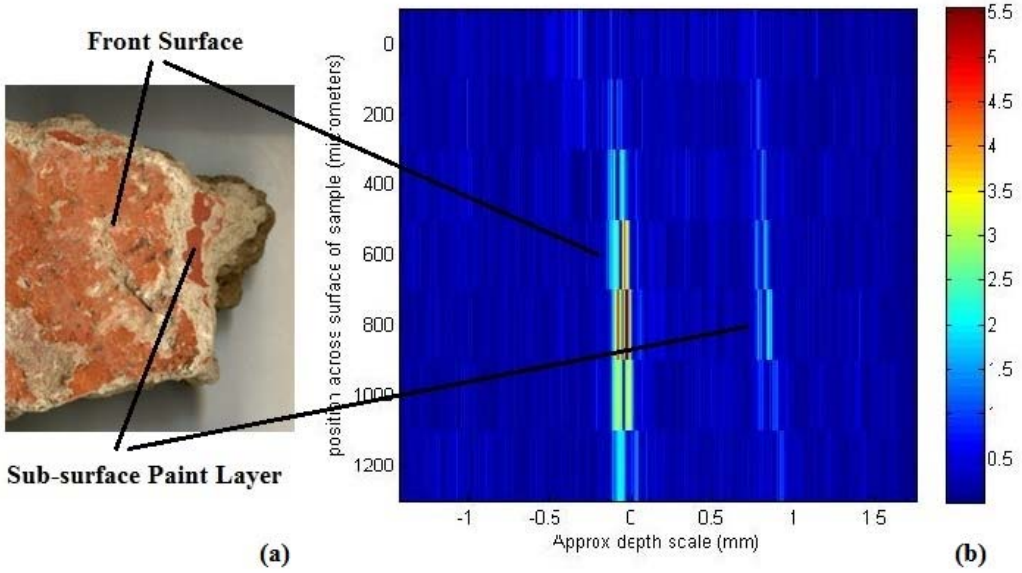

Figure 172. (a) Photograph of multi-layer mud plaster specimen from Area 4040 Space 1006, East wall F 3008, Unit (16080) and (b) a line scan of deconvolved data representing the internal structure of the wall plaster.

A picometrix T4000 terahertz pulsed imaging system was transported to Çatalhöyük and used to analyse a wall painting uncovered in the South Area, Building 80. Regions of the wall painting were scanned using an off-axis reflection technique. Figure 173 is a photograph of the experimental equipment on site.

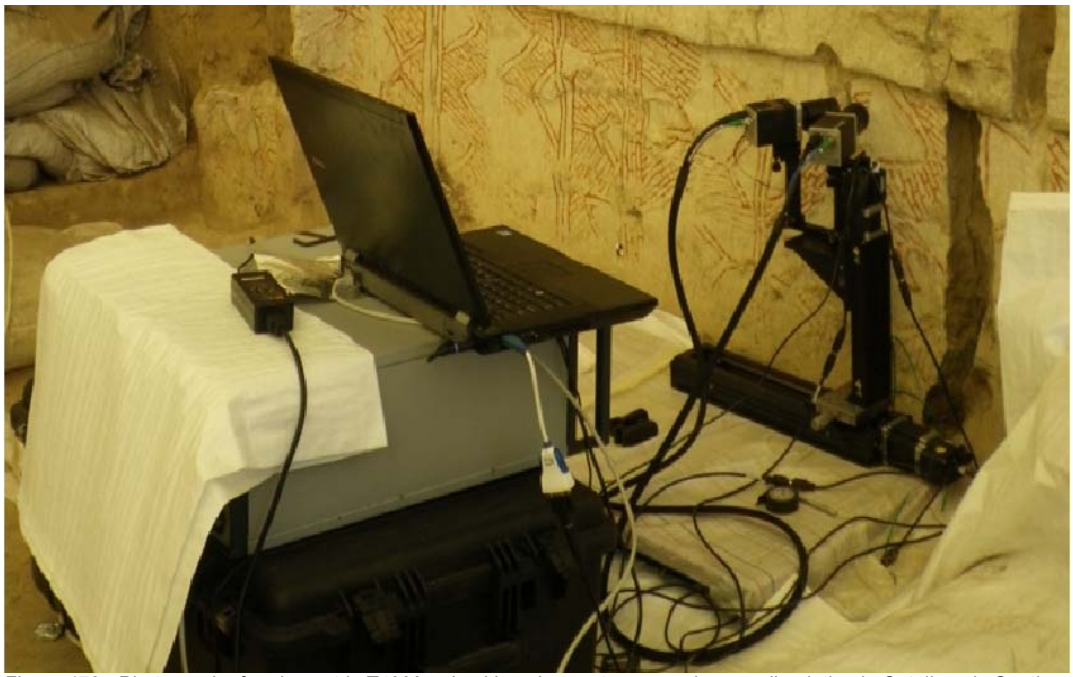

Figure 173. Photograph of a picometrix T4000 pulsed imaging system scanning a wall painting in Çatalhöyük, South Area, Room 80.

The wall painting under analysis was a painted section of wall plaster located above a burial site. Excavation indicated that the image was repeated at various levels within the plaster, sections being re-plastered and then repainted with the same design. The design was painted on a rough plaster surface which made traditional analysis of terahertz reflection data redundant. The uneven surfaces reflected the radiation away from the detector making the identification of reflections from sub-surface paint layers a much more complex problem. An algorithm, based around a Gaussian beam coupling integral, was developed to correct for this effect and the resulting sub-surface image is shown in direct comparison to the highlighted section of wall plaster in Figure 174. This section of wall painting showed a line exposed through excavation, obscured by covering plaster and again exposed further along the design.

Further work includes developing the beam coupling integral to improve the image (Figure 174(b)) further, this being a test image to develop the algorithm before using it to analyse further scans of the wall from regions where there was no indication of the nature of the sub-surface pattern.

This was the first use of terahertz imaging in an excavation site and resulted in a wealth of practical information about how to conduct such experiments in this environment. It is hoped a second on-site trip will take advantage of this knowledge and result in the scanning of larger sections of wall to further demonstrate and refine the potential of this technique.

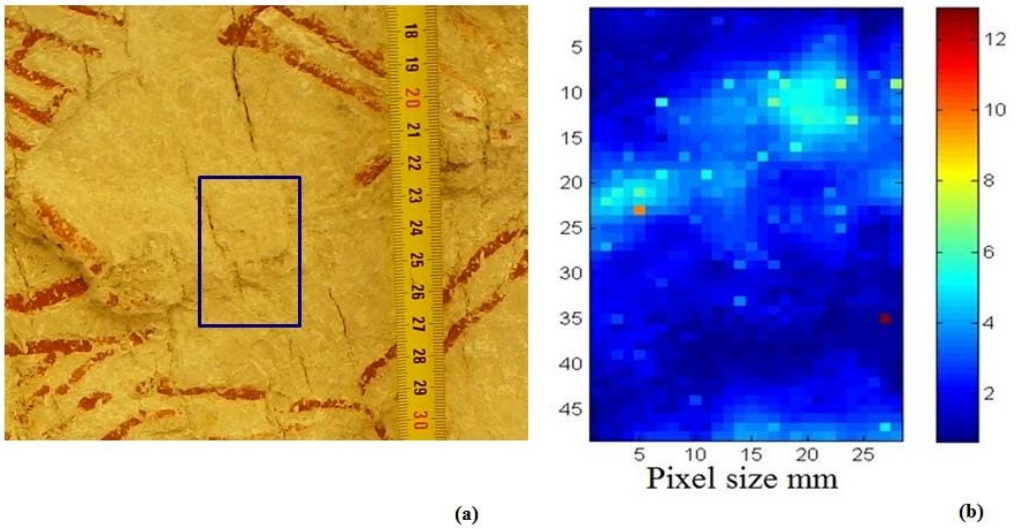

Figure 174. (a) Photograph of a section of wall painting from the South Area, Room 80 with the scanned section highlighted. (b) a reconstructed sub-surface image of the highlighted area of the wall.

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Ritual Community and Conflict Project

Professor Harvey Whitehouse (Oxford University), Dr. Quentin Atkinson (Auckland University), Camilla Mazzucato (Oxford University).

The Ritual Community and Conflict Project is a five-year (2011-2016) project funded by the Economic and Social Research Council in the UK through the University of Oxford. With the collaboration of an international team of anthropologists, psychologists, historians, archaeologists and evolutionary biologists, this interdisciplinary project aims to address the role that ritual plays in group formation, cohesion and inter-group dynamics and conflict. Integrating a cognitive, evolutionary and social approach, the project will focus on combining qualitative and quantitative research methods with carefully controlled experiments in order to reveal the dynamic relationships between collective rituals and social cohesion and morphology (Figure175).

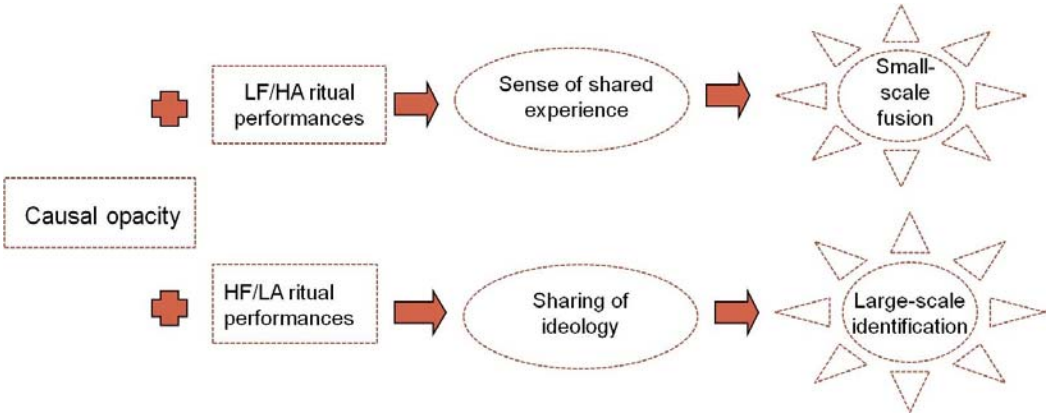

Figure 175. Modes of religiosity theory.

The project has three major objectives, the third of which seeks to determine the role of ritual in the evolution of social and political complexity. This objective is motivated by the proposal by Whitehouse (2004) that the frequency and emotionality of collective rituals are linked to social organization. Whitehouse (2004) argues that the intensity of emotional (especially dysphoric) arousal experienced by ritual participants correlates inversely with frequency of performance (Figure 176). Whereas low-frequency/high-arousal ('imagistic mode') rituals are associated with small, localized, and intensely cohesive communities, high-frequency/low-arousal ('doctrinal mode') rituals are found in large-scale, fast-spreading, and diffusely cohesive communities. Activities involving high risk and temptation to defect (e.g. raiding and warfare, hunting of dangerous animals, gangland pursuits) are associated with imagistic rituals (e.g. hazing, painful initiation rites). By contrast, endeavours requiring regular input of relatively small but cumulatively large resources across larger populations (e.g. exchange networks, systems of taxation or tribute, routinized manual labour, farming) are associated with doctrinal rituals (e.g. ritualised expressions of nationalist pride, religious commitment, corporate identity). These patterns of ritual form have important implications for how we understand the use of ritual in socio-political evolution.

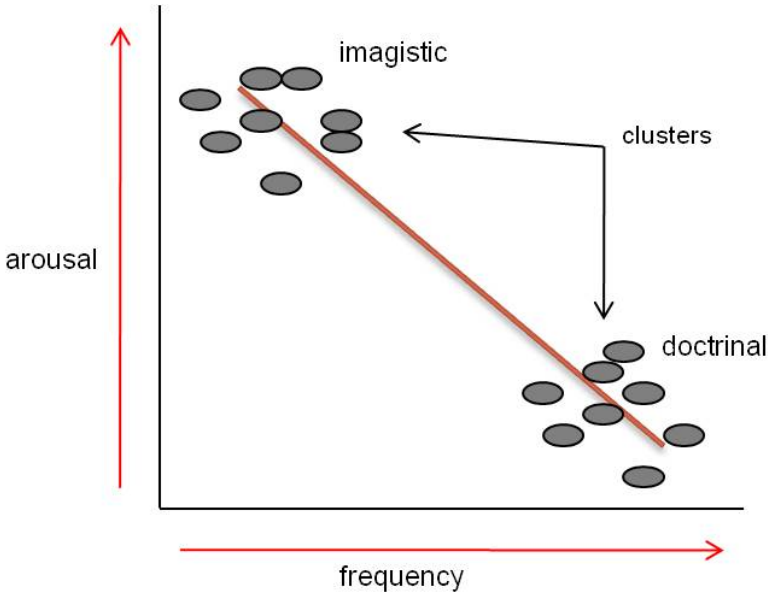

Figure 176. Plot of ritual arousal vs frequency showing two clusters of low frequency-high arousal rituals and high frequency-low arousal rituals.

In a large survey of cross-cultural ritual variation, Atkinson and Whitehouse (2011) have recently shown that the frequency and emotional intensity of religious rituals covaries with

social complexity. Consistent with the predictions of the 'modes' theory, larger societies with more reliance on agriculture show fewer highly arousing rituals, but significantly higher ritual frequency (Figure 177). It has been argued that the emergence of such rituals may have presaged the shift, beginning in Mesopotamia and Egypt, to large-scale, complex agricultural societies (Whitehouse and Hodder, 2010; Atkinson and Whitehouse, 2011). However, whilst Atkinson and Whitehouse have shown covariation of ritual form with social complexity in contemporary societies, the historical sequence of ritual evolution and the question of causality remain unexplored.

To answer these questions, we will examine the gradual shift from imagistic to doctrinal rituals and associated social morphology in at Çatalhöyük, where there is a well-preserved transition from a predominantly hunting-based economy based around imagistic group dynamics, to a farming-based society which may have been one of the first populations in human prehistory to adopt doctrinal rituals (Whitehouse & Hodder, 2011). The Çatalhöyük site data will form the core of the archaeological data to be used in this objective of the grant. The large site Access database will be the starting point for a quantitative investigation of ritual practices and their correlation with social morphology evolution at the site. This work uses a site-wide quantitative framework to build on Whitehouse and Hodder's (2010) work on the modes of religiosity at Çatalhöyük, which argues for the emergence of a doctrinal mode of religion in the latest phases of the settlement. By quantifying changes in ritual practice at the site through time we will test hypotheses about their coevolution with society size and complexity.

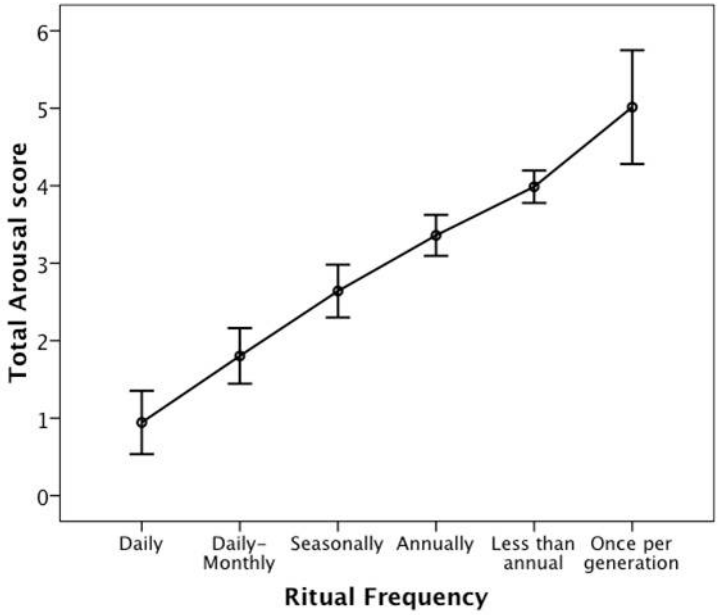

Figure 177. Total arousal scores by ritual frequency (Atkinson and Whitehouse 2011).

During the 2011 field season at Çatalhöyük, Principal Investigator Professor Harvey Whitehouse, Co-investigator Dr. Quentin Atkinson and Oxford-based researcher Camilla Mazzucato worked on site for two weeks. The main objective of the 2011 field work was the definition of a series of quantifiable variables whose change through time can be used to assess the evolution of ritual forms and social structures. In order to have the broadest picture of the evolution of social and ritual dynamics, all time periods and excavated areas on the East and West Mounds have been taken into account. Data-mining of the various Çatalhöyük excavations and specialist databases, as well as discussions with team members have been used to identify a number of relevant variables.

Quantifiable variables (changes over time):

- Agricultural intensity

Wild vs. domesticated animals (volume of faunal remains by species).

Wild vs. cultivated plant foods (volume of plant remains in bins, floors, fills, middens, activity areas, clusters).

Tools (size, quality and proportions of projectiles).

House size (storage size inside houses).

- Ritual frequency, homogeneity, scale, and arousal

Feasting events (numbers of events per house; size of animals.

Burial practices (how standardized/variable?).

Wall plastering (frequency).

Paintings, non-structural installations, faunal installations and reliefs (volume and proportions of panels, geometric/curvilinear, anthropomorphic/zoomorphic).

Mystery cults (faunal and obsidian special deposits)

- Scale and structure of communities

Wealth (volume and distribution of valuable materials, house elaboration)

Specialization (quality of pots and obsidian)

Identity markers (stamp seals, belt buckles, beads)

A series of predictions about chronological co-variation in both social morphology and ritual variables have been formulated (Figure 178). These predictions will be tested against the Çatalhöyük dataset.

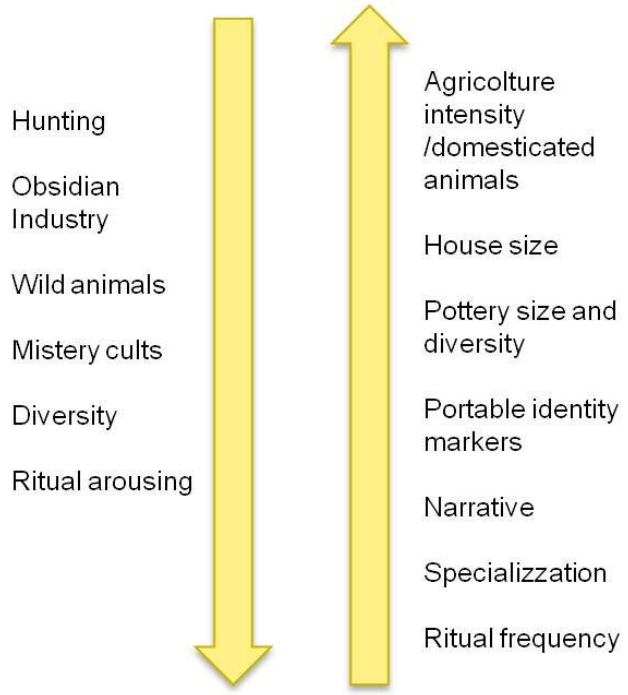

Figure 178. Predicted changes in key variables over time.

Together with the core Çatalhöyük dataset, the investigation will eventually expand to a regional and macro regional level. Relevant archaeological sites from a broad chronological spectrum (PPNA-PPNB-Chalcolithic) will be addressed. When possible, the same variables selected at Çatalhöyük will be compared and predictions tested.

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RCC web site: http://www.cam.ox.ac.uk/rcc/project-overview/

COMMUNITY COLLABORATION PROJECTS

Çatalhöyük Excavation Workshop 2011 – Gülay Sert

Team Leader: Gülay Sert (1).
Team: Nuray Kaygaz (1), Menekşe Haremkahya (2), Hatice Tokyağsun (3).

(1) Istanbul, (2) Ankara, (3) Küçükköy

The Çatalhöyük Archaeology Workshop is carried out as part of the Çatalhöyük Research Project with the aim of introducing cultural sites and the issues of protecting them to local stakeholders.

Since this project's initiation in 2003 the workshop had been focusing on children but at the end of the 2009 excavation season it was clear that most of the people living around Çatalhöyük did not know anything about the site. So from then on adults were also included in the programme, which continued in the 2011 excavation season.

Children's Education Program:
A total of 378 children joined the workshop through the month of the programme. Most of the children were from Koran courses because schools were on holiday and it was difficult to collect children from their homes in the centre of Konya and surrounding villages.

The activities at Çatalhöyük began with a presentation. Children were informed about the Neolithic life style, before touring the replica Neolithic house and excavation areas (Figure 179). In the afternoon children excavated the 1960s spoil heap and also took part in drama projects and other workshop activities. Children's attention was gained by interactive techniques as they learnt with fun and became more sensitive about cultural issues.

Figure 179. Some of the children visiting the excavation areas.

Adults Education Program:
A total of 209 adults joined this program. Some of them were officials from highway workers offices, others from the National Education Ministry, and some of them were civil community organizations.

The activities of the day ran from 10.00-14.00 at the site beginning with a general presentation. Guests were informed about the Neolithic life style before visiting the replica Neolithic house and the excavation areas, followed by discussions on the problems of protecting Çatalhöyük and sharing its knowledge.

It was clear that many of our guests, most of whom are from Konya, had not visited Çatalhöyük before this program and did not have any information about the site. Whilst this is a disappointing situation it was a pleasure and encouraging to engage with this group of stakeholders teaching them about the importance of Çatalhöyük with the help of many visual aids and connecting them to today's materials and a conversation.

In total 587 people joined the Çatalhöyük Archaeology Workshop, which ran from the 5th of July to 4th of August 2011, over a 6-day week between 10.00-15.00 o'clock. Thank you for your support to this project, which was useful for 650 visitors with the guests who were not recorded.

Community Based Research Project Report 2011 - Sema Bağcı Kaya*

Team: **Ebru Sivas

*University ofIndiana
** Küçükköy

This season's Çatalhöyük community based research project (Çatal CBR Project) lasted around 3 weeks. Sonya Atalay, Project Director, was not able to come to site due to family reasons. I conducted this season's activities and research, while we were in touch via e-mail during all my time on site. And, as in previous years, an intern from the village of Küçükköy assisted the project with activities and the process of preparation. During this time, community meetings with women and men of the village of Küçükköy were held. The fifth annual Çatalhöyük Festival was also organised.

1. Community Meetings
As in previous years, the Çatal CBRP arranged two meetings with the people of Küçükköy; one with men and one with women separately. I provided the general introduction and update for both meetings. It was similar for both the men and women. However, the focus and topics of interest were different in each meeting.

- **1.a. Women's Meeting**

The women's meeting was held in the Küçükköy- Çatalhöyük Ilkokulu school building on the 14th of July. This season's intern, Ebru Sivas, suggested that she would give a presentation to her relatives and her fellow villagers about Çatalhöyük; what she learned at her time at Çatalhöyük and its importance (Figure 180). Before Ebru's presentation, I tried to start a conversation with the women of Küçükköy; updating them about the project, about the upcoming traditional Çatalhöyük Festival; and introducing the idea of "kurul" (a village committee about heritage planning, management, and tourism). I tried to understand their views and how they feel about the Çatal CBR Project. I also tried to gather their ideas about the organisation of the Festival. About 70 women attended the meeting.

Figure 180. Çatalhöyük Intern Ebru Sivas making a presentation at the women's meeting. Photo Sema Bağcı Kaya.

- **1.b. Men's Meeting**

The men's meeting, held on July 11th, was at the office for the new cooperative of the village. It took place after the evening prayer. Around 20 people attended. After the introduction and the discussion of the current situation with the Çatal CBR Project and upcoming Festival, the discussion turned to the publicity of Küçükköy, cultural tourism, and how Küçükköy would benefit. The owner of the only gas station in the village, Mustafa Bey, talked about his plans for turning the plot behind the station into an indoors recreation space, such as a café, mostly serving tourists. Muhtar Ali Bey mentioned building a large recreation area for tourists somewhere between Küçükköy and Çatalhöyük. They discussed another idea put forward by the Muhtar Ali Bey – of having a big festival to publicise Küçükköy in which press and major government officials in Konya would be invited. Finally, the idea of a kurul, and how to establish one was discussed. We made a list of names and e-mail addresses of those who can spare their time for the activities and meetings of such a group.

2. Çatalhöyük Festival

- **2.a. Organising the Festival**

In terms of the food for the festival, there were some suggestions provided by members of the Çatalhöyük excavation team. Gülay Sert and the government representative Resul İbiş both provided helpful ideas. They suggested that we could serve pilav and chicken instead of sweet treats this year. We asked the Küçükköy residents during our casual visits to the village about what they would prefer. There were proponents of both chicken and cake. So, we decided to make the chicken-pilav treat for a change this year.

Traditionally, the feast is pilav and beef or lamb, similar to the food served in celebrations such as weddings, and circumcision feasts around this region for families who can afford it. There is no doubt that it would be very pleasing for the villagers if we served that sort of meal. However, it was not possible due to funding limitations (beef or lamb is nearly three times the amount of chicken). Instead, the menu included chicken and pilav.

Since the harvest season had started, we couldn't predict how many people would show up. We tried to visit as many people as possible to tell them about the festival day. There were announcements from the mosque minaret of the village. We also announced the festival in the village meetings. The common response we got was: "We may or may not come, we don't know". So, we arranged the food according to the number of visitors that came to last year's festival.

Children's theatre

During informal visits to some families in the village, the women's meeting, and meetings with the school principal, the children's theatre was on the agenda. In all cases village residents

suggested that, at the Festival, the children should perform one of the plays that they had prepared for and performed at the Children's holiday 23 Nisan (23rd April). The plays were short parody sketches about different topics. Everyone in the village found them quite entertaining when they watched them in the 23 Nisan celebrations. The plays were about;

- a typical quarrel between a women and her mother in law with whom she lives.
- a "how to be a roughneck (or a bullyboy)" course, which ends with the teacher getting scolded by his wife.
- a beauty contest in Çumra, in which the contesters are judged by their abilities of handicrafts, and talents in housework. In the end, the jury gets bribed and chooses a 55-year-old single women who has neither ability nor talent.

Laboratory tours by the children

As in previous years' festivals, we arranged laboratory tours guided by the children of Küçükköy for the visitors. The idea behind this is that the children will attract attention to the laboratory and make the visitors more comfortable asking questions about the laboratory work done at Çatalhöyük. There were youth guides, aged between 8-15, for the pottery, conservation, human remains, animal bones, botany, and lithics laboratories. Team members working in the laboratories were very helpful and spared their valuable time to train these children briefly about the work they conduct.

- **2.b. Festival Day**

The 5th annual Çatalhöyük Küçükköy Festival was on the 21st of July. It was harvest time for the villages around Çatalhöyük. People were trying to finish their work in the fields before Ramadan began. So coming to the festival meant taking a day off work. Yet, there were almost 300 people from Küçükköy and unfortunately only a few families from the guest village Hayrioğlu. It should be noted for the next season that it is better to make the festival before the harvest starts in July, so that more people from the villages can attend.

Figure 182. Ian Hodder making a presentation at the 5th Annual Çatalhöyük Küçükköy Festival. Photo Sema Bağcı Kaya.

After the site tours Ian Hodder made presentations to the visitors, women and men separately (Figure 182). There were not many requests for or attention to site tours from Küçükköy residents. Most of them said: "We have seen and know it already". Gülay Sert assisted us in inviting a local theatrical dance team called Sodur (Figure 183). They performed several improvised comedy dance plays (Figure 184). A local traditional band performed the music who have taken part in previous festivals. Children from Çatalhöyük Küçükköy Primary School

performed a play formed of separate sketches (Figure 185). Youth laboratory tour guides stood ready to answer questions of the visitors in front of the laboratories they were responsible for.

In the end, visitors helped themselves to the feast of pilav and chicken which was served at one corner of the courtyard of the dig house. The meal was cooked in huge pans on top firewood (Figures 186 and 187)



(from left to right) Figures 183 & 184 Sodur - a traditional dance group who performed at the Festival. Figure 185. Children from Çatalhöyük Küçükköy School performed a play at the festival. Photos Sema Bağcı Kaya.

3. Çatalhöyük Intern

This year's Çatal CBR Project intern was Ebru Sivas, a 16 year-old-girl from Küçükköy. I had a meeting with her family in which I explained the intern project and spoke about the previous interns. They were familiar with the previous interns but not sure what their responsibilities at Çatalhöyük had been. I explained that we would work together in the project, and that Ebru would get to know anything she wanted to about Çatalhöyük. She would be paid a small sum for her work at the end of her time as an intern. They agreed that Ebru could become an intern, and gave permission for her to spend full days on site during her time as a project intern. Furthermore, they seemed happy that she was involved in the project. This was in stark contrast to the parents of the young women who had been involved in the handi-crafts project, who became uncomfortable with their daughters coming to the site everyday. Ebru has 4 sisters and no brothers. Ebru's parents are exceptional in the village who think all of their daughters should go to college and have jobs (a job in the government if possible). Ebru was very interested, enthusiastic, and hardworking whilst we worked together.

Figure 186. Pilav and Chicken cooking for the guests of the festival. Photo Sema Bağcı Kaya.

Figure 187. Guests helped themselves to chicken and pilav at the festival. Photo Sema Bağcı Kaya.

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