The Performance of Building and Technological Choice Made Visible in Mudbrick Architecture

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In a densely packed, streetless village such as Neolithic Çatalhöyük in central Anatolia, it is argued in this article that variations in mudbrick recipes were used to mark social identity and autonomy through the performance of building. Geoarchaeological analysis of mudbricks established that cultural modifications were used to create social differences between neighbouring houses. Although mudbricks were ultimately invisible objects, hidden behind multiple layers of plaster, the processes of mudbrick manufacture and house construction were performed in the public domain allowing opportunities for individual expression. These results are situated within a larger practice of hiding and burying meaningful objects at Çatalhöyük, where unseen objects had as much power and affect as any object on display.

Building materials are a standard topic in architectural discourse as they make a significant contribution to the character, mood and statement of buildings (Norberg-Schulz 1980; Pallasmaa 2005; Rasmussen 1962; Strelitz 2008), yet these attributes are rarely addressed in archaeology. Buildings can communicate through their materials, size and placement (Blanton 1994; Johnson 2010; Rapoport 1969; 1982). Given the active role of architecture in culture (Buchli 2006; Bailey & McFadyen 2010; McFadyen 2006), it seems to be a major oversight not to interpret building materials as a viable artefact assemblage. Using a case study from the Neolithic village of Çatalhöyük, Turkey, sun-dried mudbricks are examined in order to demonstrate how the process of brick manufacture and house construction can express aspects of social identity made visible through the performance of building.

At Çatalhöyük, mudbricks were never seen after the initial construction phase. As soon as the house was occupied, the interior surfaces were immediately plastered (Matthews 2005a,b) thus hiding the mudbricks. All the Neolithic houses at Çatalhöyük had roof entrances and the dense clustering of houses with abutting walls meant that exterior walls were rarely visible. Houses on the settlement periphery had mud plaster on the exposed walls (Farid 2007b, 290) for protection against sun and rain (Hodder 2007b, 27). The only time when mudbricks were visible was during their manufacturing phase and as the buildings were being constructed. Unlike small-scale activities that could have been conducted indoors, privately or without being seen by others (such as retouching an obsidian tool or shaping a clay figurine), the manufacture of mudbricks and houses was a large-scale, outdoor activity involving a suite of actors, locations and materials over a certain length of time. Social technology and ethnographic analogy are employed here to illustrate how the same source materials were used in different ways, comparable to the production of ceramic vessels, where different potters use the same materials in various ways while producing similar-looking vessels (van der Leeuw 1993). During phases of mudbrick manufacture and house construction, individuals and groups of actors had a similar opportunity to make a statement. In a village such as Çatalhöyük with its mudbrick houses of relatively uniform shapes and sizes, it is suggested that variations in brick recipes could have been an expression of difference amongst the sameness, especially given the tradition of hiding meaningful objects at Çatalhöyük.

Using standard geoarchaeological methods, I demonstrate how subtle differences in the physical properties of mudbricks between contemporary and neighbouring houses were used as markers of social

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distinction. Çatalhöyük was a large egalitarian village lacking monumental or communal architecture (Hodder 2007a), therefore it is possible that individual signatures present in mudbricks may have been used as an expression of independence, difference or boundary. Ethnographic parallels are used to illustrate how other cultures intentionally employ building materials to express social wealth, status or difference. These results are situated in a larger practice of hiding and burying meaningful objects at Çatalhöyük, where unseen objects had as much power and affect as any object on display. The case study of domestic architecture from Çatalhöyük illustrates how architecture can communicate through different-coloured materials and independent mudbrick recipes. However, as invisible objects, the only opportunity for these materials to publicly communicate is through the performance of construction.

Communicating through materials

This research begins with three foundational assumptions. The first is that architecture is an artefact and, as such, can be considered active material culture (Bailey 2005; McFadyen 2006; Morris 2004; Steadman 1996). As material culture, houses are vehicles for making social and cultural categories tangible (Blanton 1994): houses are in us as much as we are in them (Bachelard 1997). The second is that architecture communicates non-verbally through a series of culturally specific symbols, including form and materials. Thirdly, materials are deliberately used as a social expression. The quality of materials, construction techniques, location, size and elaboration of a structure are all different modes of non-verbal communication. These three foundations are employed to understand the engagement of people with their architecture through materials. In my view, these three foundations are all visible in the process of house-building at Çatalhöyük.

There is an established tradition in the discourse on the British Neolithic that accepts material culture as meaningfully constituted, purposefully created and manipulated by human agents (e.g. Barrett 1994). Monuments, such as long barrows, portal dolmens, henges, causeway enclosures, cursus, etc. have long been interpreted through this theoretical framework (see Bradley 1993; Richards 1996), focusing on the act of construction and exploring the relationship between social behaviour and material culture. Barrett (1994) argues that the process of construction was as important to the societies that built these monuments as the final product (see also McFadyen 2006); people create themselves through the structures they build. Although this literature tends to focus on the monumental, and mostly funerary structures, the same ideas about material culture and the process of construction can be used in a domestic setting to interpret houses (Hodder 1994; Richards 1990; Whittle 1996).

It has become an accepted premise that houses are cultural constructions (Rapoport 1969) that exhibit social values (e.g. Tan 2001), which can be considered the material expression of culture, both enabling and constraining relationships between people and their actions. Cameron (1998, 186) has suggested that architecture is 'one of the best classes of material culture in which archaeologists can seek clues to social identity'. People have the capacity to shape their personal environments and to relate to other members of their societies through the medium of the house (Beck 2007a; Carsten & Hugh-Jones 1995; Joyce & Gillespie 2000). Thus, the sociality of the house highlights the interconnection between people and the houses they build.

Recent trends in the archaeology of architecture discuss architectural agency and materiality (Beck 2007b; Carsten & Hugh-Jones 1995; Joyce & Gillespie 2000), but all too often the material fabric of a house is ignored. If architecture is active material culture, then examining the fabric of construction is essential for understanding the society behind the structure. Architecture is powerfully evocative and non-verbal expressions are communicated through building materials and other non-functional architectural features (Blanton 1994; Buchli 2004). A house, as an object, communicates through its materials to the occupants, neighbours and to the larger community.

A consistent narrative in the archaeological literature on domestic architecture regards the house as a social object (Beck 2007a; Hendon 2010; Johnson 2010; Joyce & Gillespie 2000). As an object, the house 'becomes' a social subject through the performance of construction (Inomata & Coben 2006; Mitchell 2006). McFadyen (2006, 93–4) points out that technical practices are often separated from the act of construction and encourages archaeologists to collapse the production of material culture with the production of architecture. Various construction activities can be considered a stage for social performance (Shanks 2004) and the collective social process involved with house construction. The house is the stage for social actors to play out their daily lives, and the community becomes the audience of observers or participants, both passive and active. Connerton (1989) argues that societies create and re-create themselves through bodily practices and through repeated performances. The performance of building houses is a tactile, public act, involving the body in physically constructing a house. These theories maintain that construction is an act of performance that constantly repeats, reinforces and contests social roles in a public setting.

Materials are consumed in the public domain and expressed through the non-verbal communication of the house, through the performance of building houses. Anthropological studies of the house (Benjamin & Stea 1995; Birdwell-Pheasant & Lawrence-Zuñiga 1999; Buchli 2002; Carsten & Hugh-Jones 1995; Cieraad 1999) have established that the house represents the worldview, how people view themselves and view their physical surroundings. These values are reflected in the physical constitution of the house. This is where mudbricks, and their value for social interpretations, come into play. If mudbricks were only visible during manufacture and the process of construction, then an examination of production, technology and building is where social information can be recovered.

The social process is what converts material products into consumable cultural objects, from earth, to mudbricks, to houses. The process of construction is understood by focusing on the activities related to building houses simply because activities produce artefacts. More meaning is present in the social experience of making artefacts, such as houses, than there is in the symbolism of the artefacts themselves (Pfaffenberger 1999). Making an object is an expression of a cultural idea, supported by the necessary actions to put the object into existence. Yet, once the object is made the process disappears into the finished product, so meaning is sought in the object through the idea it expresses, rather than looking for the process from which it was created (Ingold 2000). This inversion of process and product emphasizes the material outcome of human activities.

Throughout the discourse on mud architecture, the choices of building materials are narrowly understood for their practical qualities and pragmatic characteristics, such as proximity to building site, plasticity, compression strength, soluble salts and other mechanical properties (van Beek & van Beek 2008; Keefe 2005; Minke 2006). While there may be a strict baseline to maintain basic structural integrity, a mudbrick is tolerant of a wide range of sediments and organic inclusions. This is not to dismiss the importance of these mechanical properties, but a pragmatic approach overlooks any non-functional characteristics, ignoring the potential of mudbrick artefacts to represent both functional and symbolic attributes. For the Dogon (Lane 1994) and the Batammaliba (Blier 1987) in West Africa, if the proper rituals were not strictly followed when making the house, the house could potentially 'bewitch' the residents. Recent material culture studies on everyday objects (Miller 2008; Miller & Woodward 2012; Stewart 2007) highlight the importance of investigating common, mundane objects as significant contributors to the social creation of self. Working with the idea that people create themselves through materials (Tilley 2004; see also Kopytoff 1988), it becomes possible to recognize these aspects in the process of building mudbrick houses at Çatalhöyük.

Domestic architecture of Çatalhöyük

Çatalhöyük is a Neolithic village located in the Konya Plain of Central Anatolia, Turkey. James Mellaart first excavated the site in the 1960s and new excavations began in 1993, directed by Ian Hodder, as the Çatalhöyük Research Project (ÇRP) (Hodder 1996b). Situated on an alluvial fan, the Neolithic mound rises up 24 metres, spans 13 hectares, and is comprised of 18 occupational horizons (Hodder 2006; 2007a), from *c.* 7400–6000 BC (Cessford 2001), with an estimated population ranging between 3000–8000 individuals (Cessford 2005). Houses were constantly being built, maintained and re-built yet each house was individually constructed. Neolithic Çatalhöyük houses were constructed with large (*c.* 70 × 30 × 9 cm) sun-dried mudbricks and mortar with wooden posts to support the roof. A tightly agglomerated settlement pattern lacked streets or space between buildings (Fig. 1), forcing all residential mobility to be conducted on the rooftops. All houses were entered through the south-east corner of the roof, as evidenced by a plastered ladder scar present on the south wall. New houses were built upon the foundations of previous houses, and the new layout often mirrored that of the previous house. Houses were built abutting neighbouring houses and each house had a similar basic rectangular size and shape, and internal arrangement of features, such as platforms, basins, hearths and storage bins. Some houses were more elaborate than others, with intramural human burials, wall paintings, sculpted wall reliefs or art installations using animal bones (Düring 2005; 2007; Ritchey 1996), leading Mellaart (1967, 77–8) originally to identify some buildings as 'shrines'. Yet, when compared with other Neolithic settlements in Anatolia, such as Asıklı Höyük, Göbeklı Tepe or Cayönü, Çatalhöyük lacks both monumental and large 'public' or communal architecture (Hodder 1996a; 2007a).

Recent research suggests that Çatalhöyük may represent a 'house-based society' (Bloch 2010; Düring 2007), as originally defined by Claude Lévi-Strauss (1979; see also Carsten & Hugh-Jones 1995; Gillespie 2000; 2007). Bloch argues that the house was important at Çatalhöyük during all phases and this importance exceeded practical functions. The house is considered a social institution, and as Hodder and Cessford (2004, 36) argue, the house was

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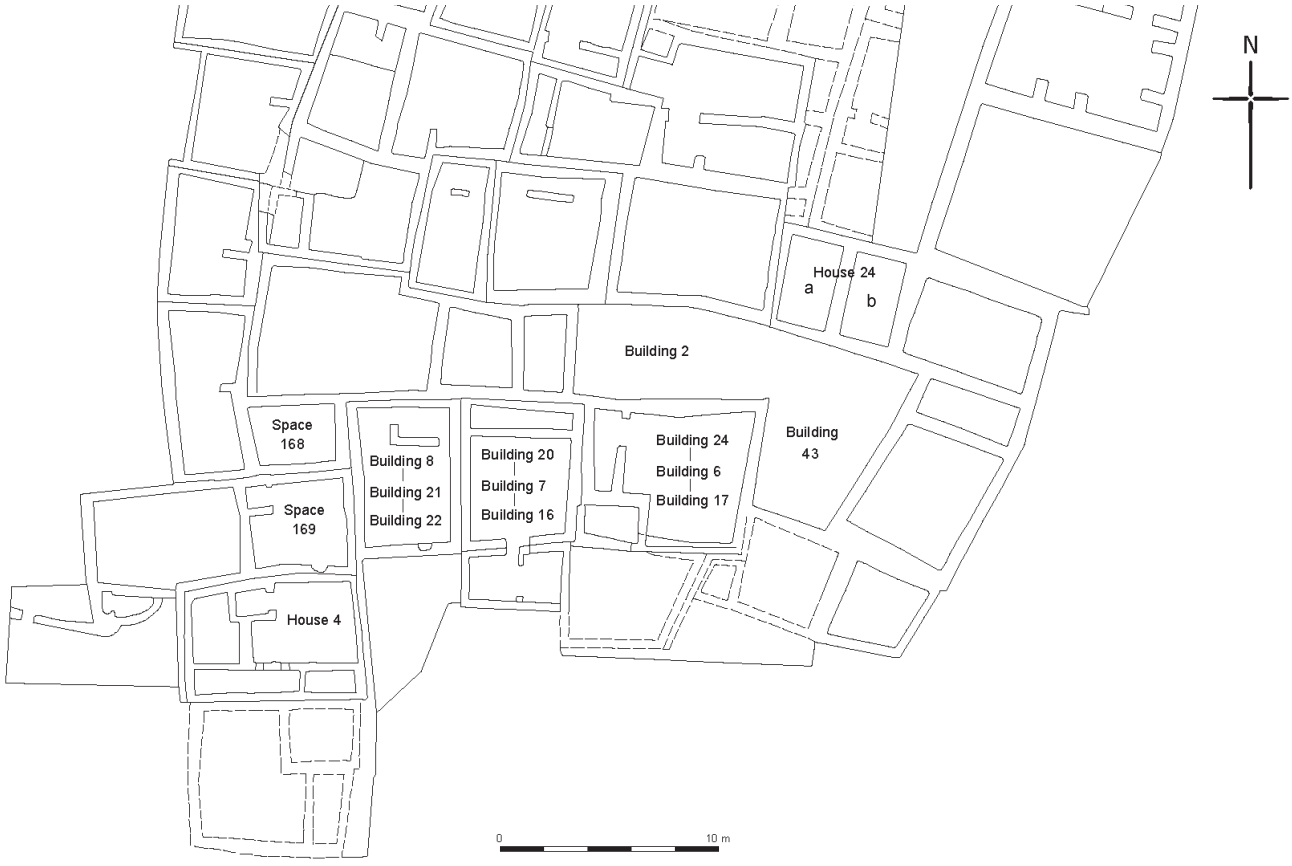

Figure 1. *Plan of the South Area of Çatalhöyük showing the buildings mentioned in the text. (Plan by David Mackie, courtesy of the Çatalhöyük Research Project.)*

a mechanism for regulating daily practices. Most Çatalhöyük houses have between three and four different phases of use, which include rebuilding and re-locating mud-constructed ovens and hearths, the creation and movement of internal walls, storage bins, basins and platforms. Micromorphological evidence suggests that houses were regularly re-plastered, with evidence of over 400 re-plastering events during the 60- to 100-year life-cycle of a single house (Matthews 2005a,b). The walls, floors, pillars and sculpted art installations were regularly subject to replastering; each new layer of plaster covers over and hides earlier layers, leading Meskell (2008) to call these episodes of 're-fleshing'.

Despite the continuity and repetitiveness of Çatalhöyük houses, subtle differences were found in various clay artefacts that suggest expressions of individuality and intentionality. There are multiple examples where different types of clay were deliberately used for specific purposes, such as pottery, clay balls, and plasters on floors, walls and internal furnishings (Matthews 2005a,b; Matthews *et al.* 2013). Ceramic and clay-ball fabrics display a high degree of variability and appear to lack a singular recipe, suggesting individual production and the use of multiple clay sources (Atalay 2005; Last 2005). The intentional use of clay materials can be established through micromorphology and x-ray diffraction (XRD) analysis, where specific plasters were employed in particular parts of a house. For example, in a study of three houses, plaster used on the east walls differed from the material used to plaster ovens (Matthews *et al.* 2013). Matthews determined that specific types of floor plasters were related to the use of space within a single house. One plaster type was used near the ovens where cooking activities occurred to demarcate 'dirty' areas, in contrast with a whiter plaster that was used on platforms, designating 'clean', ritual spaces (Matthews 2005b). Multichemical analysis revealed that two different source materials were used to construct the floors in Building 5 (Middleton *et al.* 2005). These examples illustrate an intentional use of materials and suggest how meanings and values might have been assigned to particular clay sources.

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If specific intentional patterns were found in wall and floor plasters, and were also present in other clay artefacts, could the same also be said for the mudbricks? One of the more remarkable aspects of the Çatalhöyük mudbrick assemblage is the stark visual dissimilarities in colour. This research explores processes that can account for these visual differences, and asks how we can distinguish between natural sources and cultural modifications. Were these cultural modifications intentionally used to create marked social differences, represent boundaries or differential access to source materials? Within an agglomerated village of similar architecture, were mudbricks being used to distinguish one house from another? As will be shown, the compositional analysis of mudbrick architecture contributes a unique story that cannot be seen through spatial analysis alone (e.g. Cutting 2005; Düring 2001).

Composition of mudbricks from Çatalhöyük

The analysis of mudbrick compositions considers how raw materials were used within and between groups of houses throughout the Neolithic occupation of Çatalhöyük. It is possible to identify unique combination of materials, here called 'recipes', that varied between contemporary neighbours. Although it cannot be determined with any certainty, neighbouring houses are thought to have only a few years between them, where contemporaneity is established through secure stratigraphic relationships of adjoining, abutting and bonded walls, as opposed to overlying walls of the subsequent level (Hodder 2007b). Results from previous research demonstrate a temporal discontinuity in the resources used in mudbrick manufacture, meaning that materials between levels were more distinct than the material used within a level (Love 2012). Typically, one or two source materials were in use during a single occupational phase (60–100 years) but when the house was demolished and rebuilt, a new material was used. For example, the difference between the source materials used to construct the houses in Levels L, M and N are visually and compositionally distinct; however the houses within Level L appear visually similar, as most houses were exploiting the same resource. Yet, it will be demonstrated that these visual similarities are misleading and subtle differences exist despite a shared appearance. By examining variations in mudbrick compositions, it is possible to identify the variability in source materials and tempering agents.

Identifying the unique signatures and recipes present in mudbricks can illuminate the social practices involved during the manufacture and construction processes. An entry point to access building materials is geoarchaeology, the study of archaeological sediments, to provide the empirical basis for the 'materiality' of materials (Boivin 2000; 2004; 2008; Boivin & Owoc 2004; Tilley 2004). Given recent discussions about materials, materiality and entanglement (Hodder 2011; Ingold 2007; Jones 2004), it seems appropriate to explore both the materials and the materiality of houses. Geoarchaeology can be an indispensable tool to aid a social interpretation that is grounded in solid empirical data through an understanding of colour, texture and temper, to infer how (and where) resources were collected, combined, circulated and to explore the techniques and technology involved with manufacture and construction. Standard geoarchaeological methods were employed to identify individual brick recipes, including magnetic susceptibility (Dearing 1994) and loss-on-ignition (LOI) (Gale & Hoare 1991; Garrison 2003; Goldberg & Macphail 2006; Stein 1984), to measure organic matter and the calcium carbonate equivalent value. These methods proved extremely useful as quantifiable markers of distinction when used in tandem with particle-size analysis (Blair & McPherson 1999) and multivariate statistics (Baxter 1994; Davis 1973). These methods produced quantifiable results for texture (ratio of sand–silt–clay-sized particles), organic matter, calcium carbonate equivalent content ($CaCO_3$), and mass-specific magnetic-susceptibility value (for full explanation of methods, see Love 2012). Texture, organics, $CaCO_3$ and magnetic susceptibility were analysed using principal components analysis, where the first component consistently represents more than 40 per cent of the total variation. The data presented below plot the variation and distribution of mudbrick fabrics against component one.

Two factors influence brick colour: the nature of the sediment(s) and the nature of the tempering materials. The combination of these two elements creates a unique and recognizable brick recipe. Neolithic house-builders had seven potential sediment sources available for mudbrick manufacture, as established by recent drill-core work in the landscape surrounding Çatalhöyük (Doherty 2013). Table 1 highlights the

Table 1. *Different sediment types available for mudbrick manufacture during the Neolithic. (Adapted from Doherty 2013, fig. 3.3.)*

Sediment type	Colour
Backswamp clay	Dark grey
Clay	Red-orange
Clayey-silts	Red-brown
Silts	Pale yellow and buff
Calcareous silts	Pale pink
Sands and gravel	Reddish-brown
Colluvium	Mainly brownish (varies)

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colour differences between the various sources available during the Neolithic. Not all these materials were in use at the same time but research has shown that these materials were both available and accessible throughout the Neolithic occupation (Boyer *et al.* 2006; Love 2013).

As mudbricks are a heterogeneous mixture of material, it is crucial to establish the difference between natural and cultural modification of sediments. Since the appearance and composition of a mudbrick can be altered by the inclusion of tempering agents, such as dark, ashy midden material, it was necessary to identify the effect temper had on the overall composition of a mudbrick recipe. Through independent analysis of each of measured variable, I determined that magnetic susceptibility and calcium carbonate values were the two variables that could not be significantly altered through temper (Love 2012). Therefore a change in either variable represents a difference in source material. The two variables that were most affected by temper were texture and organic matter. In other words, magnetic susceptibility and calcium carbonate values represent the unchanging, natural component of mudbrick manufacture, in contrast with the highly variable quantities of texture and organic matter, which represent the human element.

Performing manufacture

During the manufacturing phase, different materials and resources were assembled and combined. Often this process produced mudbricks with shared visual characteristics, but the compositional analysis reveals underlying differences. These distinctions would have only been publicly visible during the phase of manufacture, which includes excavating, drying, crushing, sieving and mixing. In the three examples outlined below, the mudbricks between neighbouring houses appear to be the same but, in fact, each household had manufactured their mudbricks from a different raw material source.

The first example is of four neighbouring houses, all constructed during the same occupational phase (Level South K). The mudbricks from these four houses all shared visual similarities, a silty clay texture and a light brown-grey colour (10YR 6/2). However, one of these houses (Building 17) was compositionally distinct from its immediate neighbours (Fig. 2). Building 17 had 24 per cent $CaCO_3$ in contrast with 9.4 per cent in Building 16 and Building 22, and 5.4 per cent in Building 2. Since $CaCO_3$ cannot be altered through temper, this significant difference suggests that the mudbricks of Building 17 were manufactured using a different material source than its three neighbours.

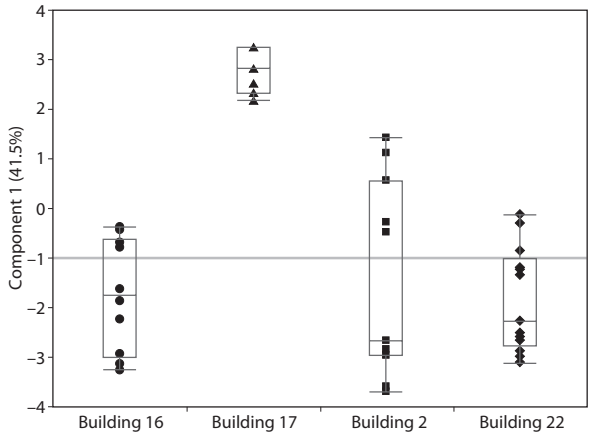

Figure 2. *Four contemporary buildings at Çatalhöyük (Level South K) illustrating the compositional distinctiveness of Building 17. Component 1 is driven mainly by $CaCO_3$ quantity* (n = *45).*

It is possible that the employment of a specific source material represents a deliberate choice, or selective access to raw materials.

A similar pattern of differing manufacture practices is present in another grouping of houses, the neighbouring houses of Building 6 and Building 43, at Level South L. The mudbrick walls of both houses share visual characteristics, described as greyish-brown (10YR 6/2) and light greyish-brown (10YR 5/2) with large inclusions of midden material, such as animal bone and charcoal. However, the mudbrick compositions vary in their organic and quantity of calcium carbonate (Fig. 3). Building 43 has more $CaCO_3$ than Building 6, which suggests that two different clay sources were used. Additionally, the mudbricks of Building 43 are marked by a higher content of midden material, 19.3 per cent compared with 13.86 per cent in Building 6, which suggests independent manufacture. The textural variability between the walls of Building 43 and Building 6 can be accounted for by the heterogeneous nature of midden deposits.

A third example in this pattern is present with three neighbouring houses at Level South M, Buildings 8, 20 and 24. The mudbricks from these three houses were visually similar (10 YR 5/3 brown), but the middle house, Building 20, has a different composition from the two neighbouring houses (Fig. 4). In this example, the mudbrick walls of Buildings 8 and 24 are compositionally similar in texture (sand–silt–clay), organics, $CaCO_3$ and magnetic-susceptibility value. However, Building 20 is distinct in five of the six variables. These three houses were all contemporary (Farid 2007b), although they were not necessarily all built at the same time. Therefore this compositional

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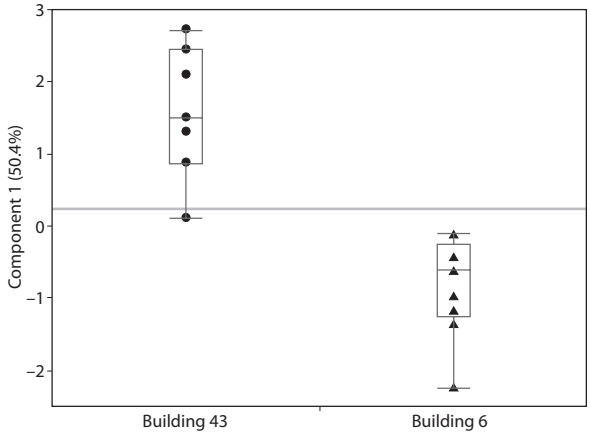

Figure 3. *Two buildings from Level South L with similar-looking mudbricks but of different compositions* (n = *16).*

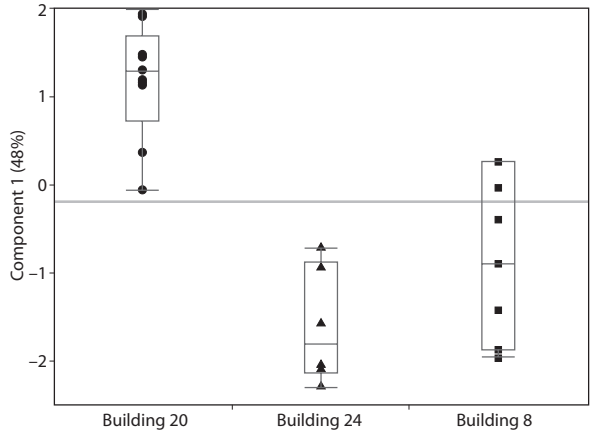

Figure 4. *Three buildings from Level South M with similar-looking bricks but of different compositions* (n = *22).*

difference was not a result of temporal difference but instead suggests that one source was shared between two neighbours but that the third house used different materials to create an independent signature.

These examples illustrate how subtle differences were built into the walls of neighbouring houses. The differences highlighted in each example were only made visible during the phases of manufacture, as the final product appeared to be similar to the neighbouring houses. In some instances, separate clay sources were being used during one occupational phase. Could certain clay sources have been privileged, controlled or in some way valued? In other examples, the same source was being shared but each house had a different mudbrick recipe. The unique recipes suggest that each household manufactured their mudbricks independently from each other. Even though the manufacture process was an independent activity, house construction was a public performance.

Performing construction

Another aspect of performing building at Çatalhöyük comprises differences that become visible during the period of construction, following manufacture. There were no significant differences in the techniques for constructing houses; all Neolithic houses were built with a single wall of long, thin bricks, varying between 30 and 40 cm thick. Bricks were laid on the wall with a thick layer of mortar, often as thick as the bricks (8–10 cm). Through time, the brick-to-mortar ratio increased from 1:1 to 4:1 (Love 2013).

The three examples cited below will demonstrate that, although house construction did not vary, different colours of brick and mortar were used in a variety of ways in neighbouring houses.

In House 24, there are two abutting walls, each with different-coloured bricks and mortar. The north–south wall (U. 12079) has brown bricks (10YR 4/3) with yellowish-brown mortar (10YR 5/4) but the abutting east–west wall (U. 12083) has a different pattern: light grey mudbricks (10YR 7/2) and light brownish-grey mortar (10YR 6/2) (Fig. 5a). Compositionally, the mudbricks of both walls are starkly different, again suggesting independent production, individual recipes and exploitation of different source materials (Fig. 5b). Although these mudbricks would not have been visible, hidden behind multiple layers of plaster, the colour differences would have been seen when the walls were being constructed.

A second example can be seen between two other neighbouring structures, Space 169 and House 4 at Level South M. In this instance, mudbricks of a different colour were used inversely in abutting walls; the southeast corner of Space 169 abuts the northeast corner of House 4. Space 169 has brown mudbricks (10YR 5/3) and pale brown mortar (10YR 6/3); in contrast, the abutting north wall of House 4 has the opposite: light yellowish-brown mudbricks (10YR 6/4) and brown mortar (10YR 5/3) (Fig. 6). Again, this inverse use of different-coloured materials appears to be intentional, where the same raw materials were being used but in different and opposite expressions.

The third example is from two contemporary houses, Buildings 16 and 22 at Level South K. These two houses demonstrate the importance of the appearance and actual constitution of a house's building material. The stratigraphic evidence suggests that

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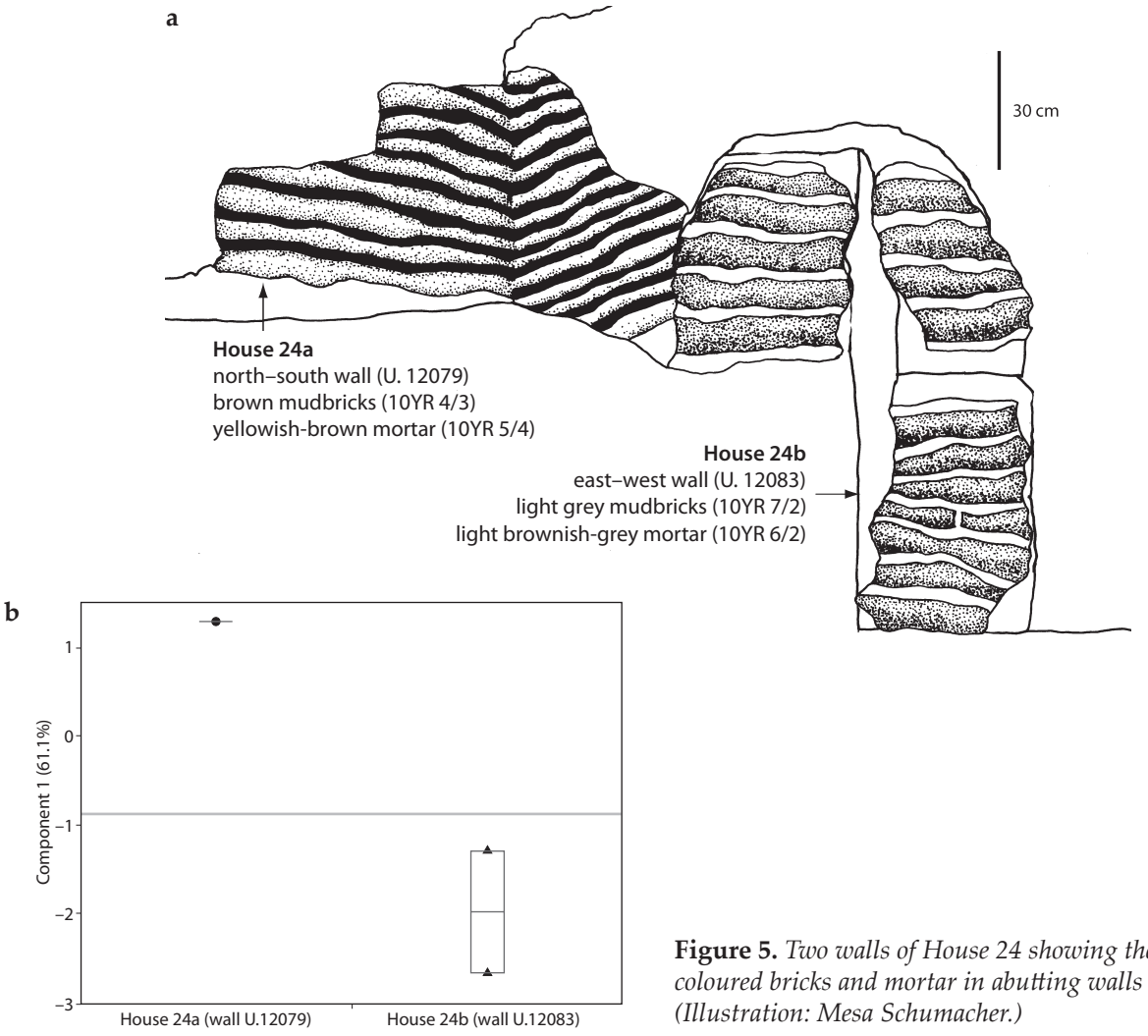

Figure 5. *Two walls of House 24 showing the different-coloured bricks and mortar in abutting walls (n = 3). (Illustration: Mesa Schumacher.)*

these two buildings were constructed at the same time, with one common wall dividing the two buildings (Farid 2007a). The mudbricks share a similar composition and physical appearance, suggesting that these two houses likely pooled resources collectively, such as sediments, chaff and other tempering materials, labour, time and space for the production of their mudbricks. However, when the walls were constructed, each house used a different mortar (Farid 2007a, 182); the mortar of Building 16 was pale brown silty clay (10YR 6/3) and that of Building 22 was light grey silty clay (10YR 7/2). These two visually distinct marl-based mortars were consistently used throughout each individual house and were interlensed in the common wall (Feature 447) (Fig. 7). Farid (2007a, 182) suggests that 'it may indicate a form of property marker' where the two buildings were expressing individuality or semi-autonomy through the choice of materials.

These three examples highlight the visual differences between mudbrick walls of neighbouring houses and demonstrate how subtle autonomy is created through the deliberate employment of clays, manifested in the house walls. Functional explanations cannot account for these colour differences, especially given that these internal walls were covered by several layers of plaster subsequently hiding the mudbricks. Contemporary neighbours had unique brick 'recipes', through which similar materials were used to create individual products. This disjuncture may indicate that a single source may have been shared between different groups but that each group had their particular way of manufacturing mudbricks or mortars. The compositional analysis has demonstrated how the technology of brick-making varied more than the technology of house construction, suggesting that the way mudbricks were made

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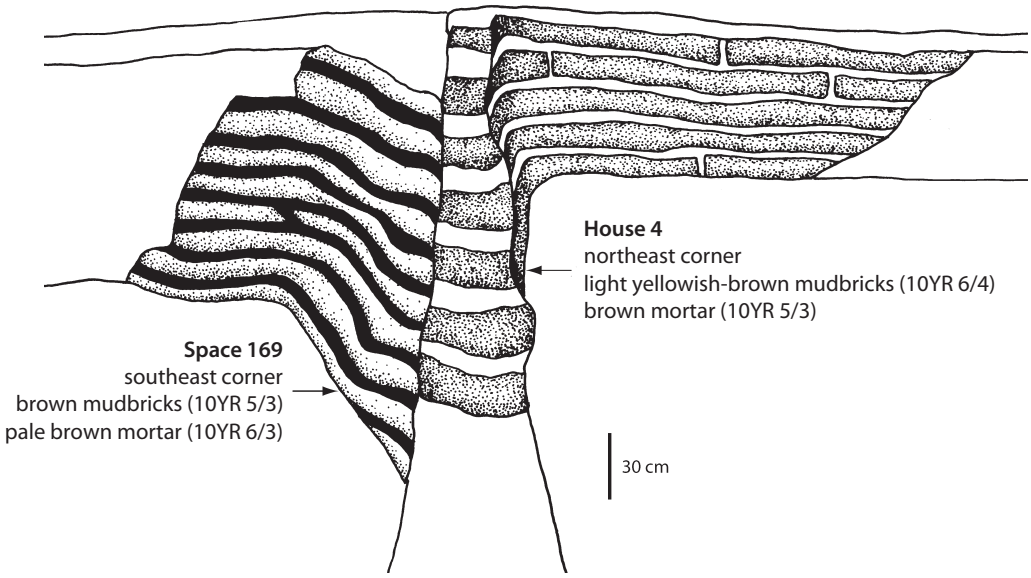

Figure 6. *Visual colour differences of two abutting houses walls, Space 169 and House 4. (Illustration: Mesa Schumacher.)*

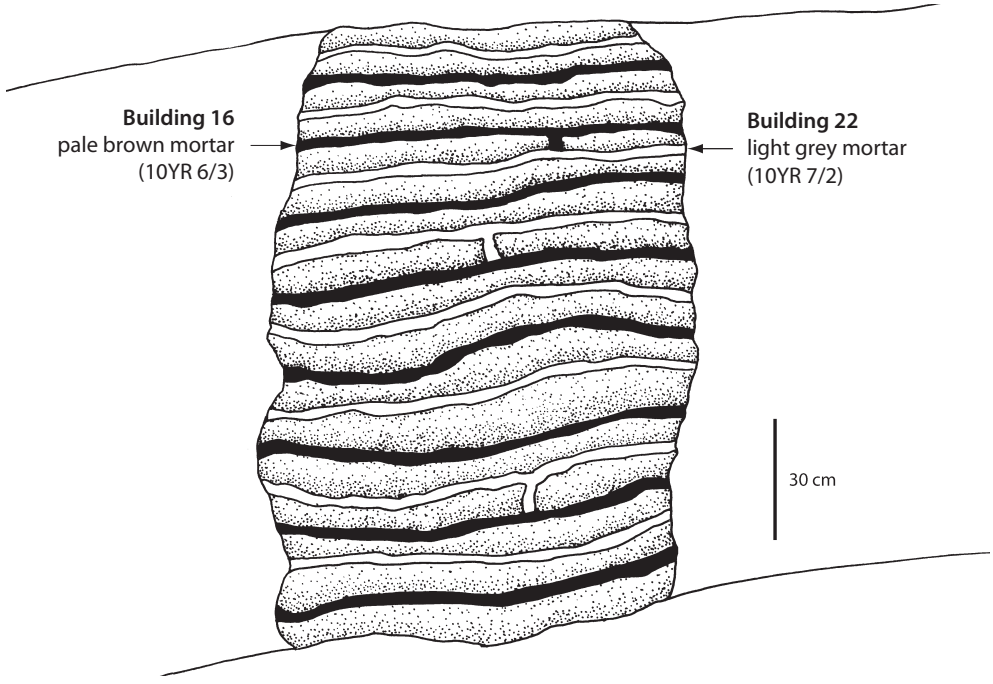

Figure 7. *Cross-section of the party wall between Buildings 16 and 22 demonstrating two different-coloured mortar types woven together. (Illustration: Mesa Schumacher.)*

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was of greater importance than the final product. Mudbricks are flexible and malleable and the production process creates multiple opportunities for individual expression that can be as unique as the individual creator.

Social practice of house construction

The differences seen between neighbouring houses could be interpreted as the result of a complex series of socially informed choices. Through studying ceramic technology it is possible to distinguish between different potters who share a single source material (Sillar & Tite 2000; van der Leeuw 1993). I argue that the same can be done through analysing mudbrick compositions. Combining the analysis of mudbrick composition with the analysis of technological practices has the potential to identify the range of social practices involved during the construction process and human interaction with the changing landscape.

The production of mudbricks involves a sequence of events in which a brick-maker makes a series of choices, 'selecting from a range of possible raw materials, tools, energy sources, and techniques' (Sillar & Tite 2000, 3). It is clear that making earthen architecture is physically demanding, time-consuming and requires a substantial quantity of materials (Facey 1997; Keefe 2005). The time and labour expense is derived from an entangled, multiphased production cycle, requiring several locations, people, tools, materials, forethought, preparation and time. Throughout the literature on modern earthen architecture, there is consensus about the production cycle for the manual manufacture of earth blocks, which includes excavation, transportation, preliminary drying, crushing and screening/sieving, proportioning, mixing, moulding, drying and storage (i.e. Houben & Guillaud 2005, 194). Mud will have to be handled and transported several times, from its source, to the mixing area, to the brick-making area, to the drying area and eventually to the wall (Clark 2003; Edwards 2002; Facey 1997). The end product is then a unique result of these choices, of which there are hundreds of variations and possibilities. Krause (1985, 30) makes an analogy between cooking chilli and making a ceramic vessel: the recipe is unique, a family tradition; each recipe is regarded as superior; and every recipe has distinct qualities and characteristics, thus each recipe can identify the potter. The analogy for brick-making is that given the same 'ingredients' each house-builder can be identified by the mudbricks they produce.

The concept which I am borrowing for understanding mudbrick architecture is that social conditions have equal, if not greater, influence on the material outcome than the type, availability or abundance of raw materials (see Lemonnier 1993). Choices made through the selection and combination of materials for mudbrick manufacture illustrate an intimate understanding and awareness of the landscape (Tung 2005), where material choice is dictated more by cultural restraints than by environmental or economic concerns (Gosselain 1994; Lucas 2001). Here, mudbrick architecture is connected to the people who produced it through the culturally specific, socially situated technological knowledge and skill.

These technological practices are visible when the sequence of people, places, materials and time involved with mudbrick production are unpacked. Multiple actors were needed to quarry, mix, mould, dry, store, carry and move materials, through various locations. Each Çatalhöyük house required an estimated 500–750 individual mudbricks (Matthews 2005a), but considering the large (70 × 30 × 9 cm) size of the mudbricks, dropping and breaking a single large brick is likely and would be a considerable loss. Therefore, a 10–20 per cent breakage rate should be factored in when calculating the total number of bricks required (van Beek & van Beek 2008). The labour investment to construct a modern earthen house measuring seven square metres is estimated at 1450 person hours to build, or 207 person hours per square metre. By that estimate, an average 4.32 sq.m house at Çatalhöyük should take 895 hours to build. Hunter (1965, 4) estimates that three people can lay between 300 and 350 bricks in eight hours. Therefore it is likely that a crew of five people or fewer could have built a Çatalhöyük house in less than one month, from start to finish.

The exact location of mudbrick manufacture is unknown but given the lack of open space in the densely packed village, these events were presumably local but off-site. Brick manufacture employed locally sourced raw materials (Love 2013), including midden tempers extracted from on-site pits and dung temper (Tung 2005). Matthews (2005a, 134) estimates that a Çatalhöyük house required about 50 m^3 of earth, 'as well as quantities of water, vegetal stabilizers and timbers'. Seeher's (2007, 37–8) reconstruction of the Hittite wall at Hattuša used an earth to straw ratio of 27:1 kg to make a single brick (45 × 45 × 10 cm) weighing 34 kg. Seeher's team used 10 m^3 of water to produce 500–600 bricks, suggesting that it 'would have been foolhardy' for the Hittites to move the amount of water required to make the bricks, instead it was easier to make bricks close to a water source and transport dried bricks. Owing to the amount of space and time needed to mix, mould and dry the mudbricks, it would

not have been possible to conduct these activities within the village of Çatalhöyük itself and there is no evidence for on-site production.

The landscape surrounding the mound is thought to have been wet and marshy for most of the year (Roberts & Rosen 2009; Rosen & Roberts 2005), therefore high and dry ground was at a premium for crops and crop processing, as well as animal grazing and penning. Reconstructions of seasonal activities, based on combined environmental data (Fairbairn *et al.* 2005, fig. 7.1), suggest that brick manufacture likely began after the spring crops were harvested and before the new crops were sown, probably during the dry, warm months of May–October. Yet, also at this time, the inhabitants were out collecting wood from a great distance, gathering fruits and nuts, and herding animals in the wider landscape. Mudbrick manufacture was just one of a multitude of off-site activities during these summer months, yet the diversity of activities demonstrates a regular movement of people, of both sexes and all ages, throughout the landscape that coincided with brick production. It is also clear that this production cycle was enacted in the public domain.

The other public aspect of the production cycle is transporting dried bricks to the house-construction site. A single brick from the Late Bronze Age site of Tell Jemmeh in Israel, measuring 63 × 41 × 13 cm weighed 73.93 kg (van Beek & van Beek 2008, 261). 'Most of us could not carry one of these bricks from the brick stack to the mason even once, much less 30 to 40 of them during a working day' (van Beek & van Beek 2008, 261). Perhaps the calculated labour hours for Çatalhöyük houses need to be increased given the sheer weight of these bricks. How were bricks moved from the drying area to the site of house construction through a village without streets? Lacking evidence for on-site manufacture, how were these large, heavy bricks carried up and down ladders and over the roofs of neighbouring houses without breaking? 'The bricks would have required considerable care in handling, and perhaps some form of rigid support to transport them from the place of manufacture to the construction site' (Matthews & Farid 1996, 289). The movement of these bricks was not an easy task.

Each phase of house construction had different labour and material investments, but also afforded distinct opportunities for expression. I argue that the manufacture of mudbricks and construction of houses were actively performed in the public sphere where the production and consumption of bricks became one venue to make a social statement, to display independence, create autonomy, or perhaps to mark a boundary within the village. In the above examples, some houses have similar mudbricks but different mortars, while others illustrate the intentional selection of types of clay.

An ethnography of building materials

Several ethnographic studies denote how meaning can be read specifically from the choice of building materials. Blanton (1994) suggests that specific building materials can be indicators of wealth differentiation. Using the concept of indexical communication, Blanton references the types of information conveyed in the selection of building materials, where the quality of materials and construction techniques act as different modes of non-verbal communication. An example of this can be seen in the introduction of European materials to the Luo of western Kenya, where corrugated iron roofs and cement construction were perceived as more valuable than traditional wattle and daub (Dietler & Herbich 1998). European furnishings were also imported and the Luo changed the shape of their structures, from round to rectangular huts to accommodate the angular furnishings. However, Dietler and Herbich (1998) stress that construction materials possess greater social status than the architectural form, since some rectangular structures are made from wattle and daub.

In a further example from a modern Syrian village, Kamp (1993; 2000) observed that variations in construction materials and techniques were more indicative of household wealth than was overall structure size. The mudbrick architecture in this village was relatively uniform so the use of expensive concrete blocks and/or pane-glass windows was a clear indication of affluence. Conspicuous consumption is a public display of affluence and the most visible part of a household is its dwelling, thus the domestic compound was one obvious place to display wealth. Less-wealthy families manipulated the village ideal of wealth and improved their social standing by maintaining well-plastered rooms and floors, constructing a separate sitting room, etc. (Kamp 2000). These examples illustrate how building materials have the potential to communicate meaning and the intentional use of specific materials may be a physical manifestation of cultural beliefs and values.

Johnson (2010) suggests that 'regional dialects' exist in his analysis of English vernacular architecture from AD 1300–1800. It is easy to forget that houses are 'not just a series of techniques, but a series of builders and owners' (Johnson 2010, 38), each creatively using their materials to make a unique statement, making each house slightly different from the next. Within the national language of timber framing, Johnson identi-

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fied local, regional dialects, where subtle differences are not a result of the types, variety and quality of available materials but more likely to be material statements about the people and communities who created them. For Johnson (2010, 41), houses are 'not always objective': material, social and cultural landscapes have strong influence in the construction of houses, more than just being a reflection of a particular building technique or raw material.

These ethnographic examples illustrate how meaning can be read from architecture, but specifically from the building materials used. When all the architecture is the same size and shape and made from the same materials, subtle differences represent variants on a common theme and can be used as a social expression, of status, independence, inclusion or wealth. I argue that building materials are apt carriers of social meaning and cultural value. So what if building materials were used to create difference amongst undifferentiated building form? What if the materials used to build the house were markers of group membership or difference? There are no major 'stylistic' differences in the Çatalhöyük mudbricks, but compositional differences are likely to reflect differential uses of resources in the landscape, and combinations of materials during the manufacture process. However, visual differences were only apparent while a house was being constructed, so who would care about these compositional differences and why? Are these differences intentional or meaningful? I argue that these material differences could have been used as social indicators, as intentional attempts to mark differences between neighbouring structures, or perhaps to establish household boundaries, identity or autonomy, especially given the tradition of buried objects at Çatalhöyük.

Maps and buried objects at Çatalhöyük

Differing mudbrick recipes between neighbouring house walls, may have been one means, among others, to express social differences or autonomous relationships. This point can be further illustrated through a wall mural, first revealed by James Mellaart (1967), which evidently depicts a plan of the Çatalhöyük village (Meece 2006), with each rectangular form representing an individual house (Fig. 8). Of interest is how each independent form has space between the walls, when in reality the village is a dense cluster of houses with abutting double walls and no streets or spaces between buildings. Conceptually, however, the occupants may have had an autonomous concept of house boundaries, where each individual house conceived of itself as separate from its immediate neighbours.

Another expression of autonomy can be seen in the rarity of party walls (Hodder 2006, 86). Houses at Çatalhöyük had their own four walls, which could establish a private independence from the neighbours by physically and emotionally creating a boundary. Hodder (2005a, 15) suggests there was a 'desire to retain a house-based autonomy. To have party walls would have restricted a particular house's ability to rebuild or change. The independent brick type used by each house is remarkable. It is as if, despite dense packing, each house retains its autonomy'. This autonomous independence could be argued to be a general theme throughout the region, where there is evidence supporting a decrease in group conformity and independence from the group is becoming increasingly consensual.

Buried objects and hidden meanings

For as much as these visual differences in mudbricks have been emphasized to the Çatalhöyük inhabitants, it is crucial to remember that all internal spaces at Çatalhöyük were covered with multiple layers of plaster, rendering these distinctions invisible after habitation began. Internal walls were immediately plastered, and regularly re-plastered, while exterior walls were either mud-plastered (Farid 2007b) or were invisible because they abutted other structures. Therefore, mudbrick walls were invisible objects. However, there is a defined trend of burying objects at Çatalhöyük, so just because an object was not visible does not suggest that it was meaningless. In several instances, multiple human burials were placed under the platforms and floors while the house was still being occupied (Andrews *et al.* 2005; Düring 2005), but these bodies were not interred and simply forgotten. In two examples, a headless skeleton had cut marks on the upper vertebrae and evidence to suggest that the head was removed after initial burial (Farid 2007c). It would have been necessary to remember the exact location of a burial when returning to the grave to retrieve a skull or other body parts (Hodder 2006, 147). Elaborate wall paintings were intermittently visible (Hodder 2006, 190) while others were 'buried': plastered over with an identical design reproduced in the exact same location (Eddisford in press; Meskell *et al.* 2008, 150). Like most Near Eastern tell sites, even the houses were buried, under other houses or middens (Nakamura 2010, 308).

There are other examples at Çatalhöyük of hiding and burying meaningful objects out of sight. Meskell (2008) discusses the repetitive practice of embedding and curating, and the relationship with materiality and memory. These practices can be seen

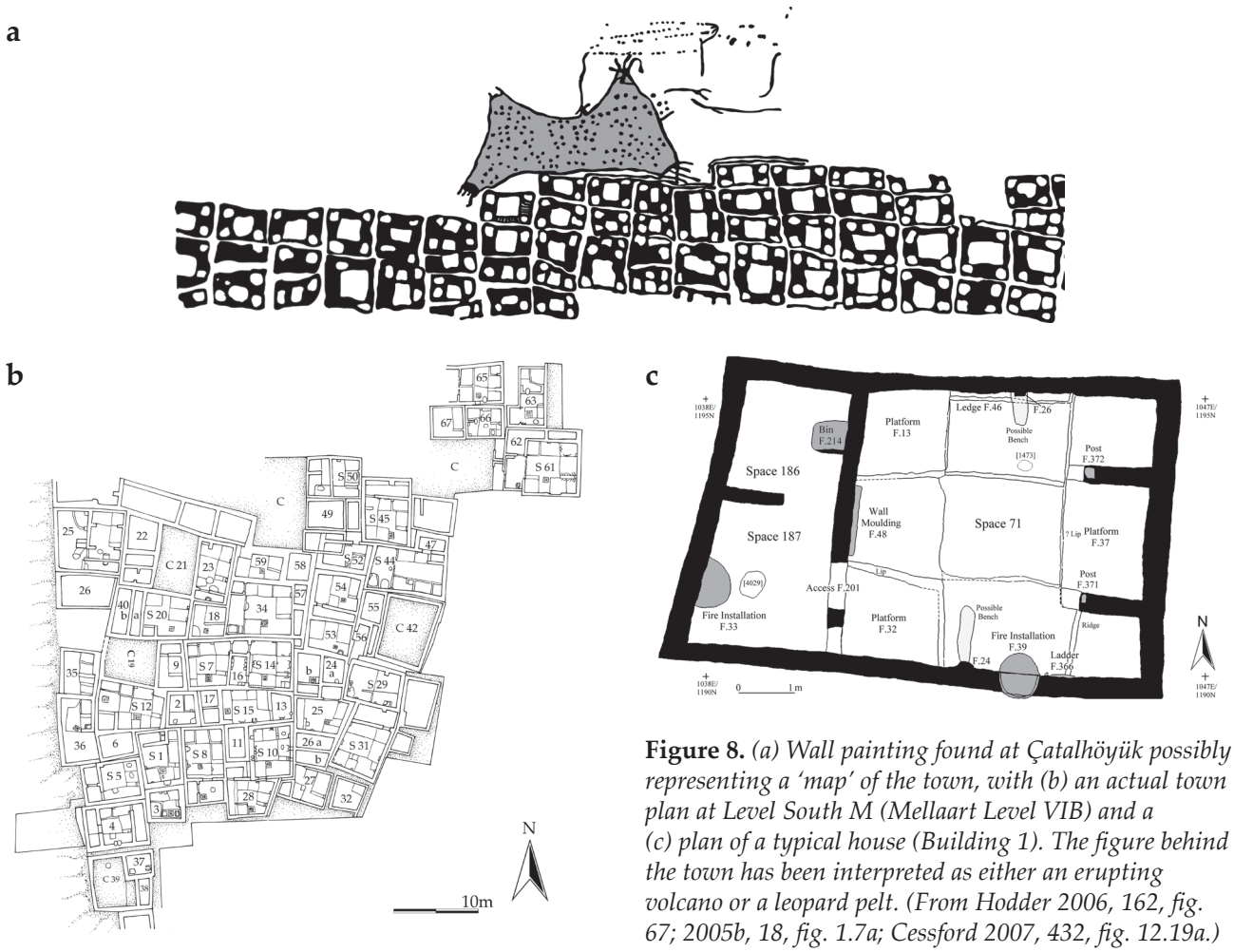

Figure 8. *(a) Wall painting found at Çatalhöyük possibly representing a 'map' of the town, with (b) an actual town plan at Level South M (Mellaart Level VIB) and a (c) plan of a typical house (Building 1). The figure behind the town has been interpreted as either an erupting volcano or a leopard pelt. (From Hodder 2006, 162, fig. 67; 2005b, 18, fig. 1.7a; Cessford 2007, 432, fig. 12.19a.)*

in some Çatalhöyük houses by intentional burial and hiding of objects. A hoard of 12 imported obsidian blades was buried in the floor of Building 1 and sealed by a grinding installation (Cessford 2007, fig. 12.23), making it clear that there was no intention of recovery. A number of obsidian caches were buried within living spaces, with no association with foundation deposits or abandonment rituals (Carter 2007). Other examples of buried objects in living spaces include a boar jaw, a bear claw, a vulture talon and skulls of foxes and weasels that were embedded into lumps of clay, mounted on walls and hidden behind multiple layers of plaster (Russell & Meece 2005, 220). Animal parts, such as cattle scapulae and cattle horn cores, were sometimes built invisibly into a wall (Russell & Meece 2005). A pattern thus emerges of hiding some things that were not intended to be recovered, while others were hidden and later retrieved.

In a discussion of 'magical deposits', Nakamura (2010, 310) discusses how buried caches of rare objects were recovered from 'liminal spaces and moments — points of closure or transition (transformation) in the life cycle of the house such as infill deposits, floor abandonment, construction, retrieval pit or bench construction'. These items included obsidian, crystals (speleothems) and pigment, found in combination with pottery, flint, human bones, ground stone and figurines. In one example, an animal bone, figurine, human infant leg bone, stone, obsidian and a crystal were found together in a construction deposit of Building 65. During the destruction phase of Building 49, an animal skull, grinding stone, animal bones and plant seeds were placed together in the post-retrieval pit after the timber post had been removed but prior to the infilling of the house. Once these objects were buried, they were never again visible. Burying these objects had no apparent practical function or purpose. These materials were knowingly buried and continued to act through their presence within the social sphere. Therefore, it can be argued that these objects continued to perform, to project and to act symbolically beyond their burial, through their ascribed material qualities.

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The house as social object

Since Çatalhöyük lacked public architecture, Hodder (2006; 2010) argues that all ritual activities were centred on the house. The importance of the house as a social object was evident in the activities surrounding the construction and dismantling of a house. The life-cycle of a house is estimated between 60–100 years (Matthews 2005a; Hodder 2006), with the average age of adults being 35 years (Pels 2010, 229), it is clear that houses were occupied for several generations before being rebuilt. Houses at Çatalhöyük were not simply abandoned and left to deteriorate. Rather they were subjected to various treatments before partly demolishing the walls and carefully filling them prior to the construction of another house. Houses appear to have experienced 'closing' rituals (Matthews 2005a; Twiss *et al.* 2007), where the floors were carefully swept clean and the floor mats were removed: the walls were scoured, the art installations were removed, the support beams were detached and the roof was dismantled (Farid 2007a). In Building 5, a greenstone axe was placed on the floor after the floor mats had been removed (Cessford 2007); cattle scapulae had been laid over the hearth in Buildings 3, 17 and 23 (Russell *et al.* 2009). Objects such as obsidian, grinding stones, bone points and figurines were deliberately placed on clean floors, ovens and basins, after these features had been prepared for destruction (Regan & Taylor in press). In addition, evidence for feasting rituals stems from the recovery of bones of large, wild, male cattle of significant meat-bearing body parts found mixed with building infill material (Russell & Martin 2005). These activities indicate that building a new house may have been a non-ordinary affair, where construction activities 'had to be carefully managed and ritually sanctioned' (Hodder 2006, 129). Deliberate acts of construction and demolition can be interpreted as performative acts, part of the beginning and end of a house's life-cycle.

If closing a house was ritually performed, can the same be said for its construction? Commemorative deposits recovered from house foundations suggest ritual association with the construction of a new house, including the placement of human skulls at the base of postholes (Farid 2007b), neonate burials in foundation deposits (Regan & Taylor in press), and a plastered skull of an adult male found in the arms of an adult female in a pit as part of the foundation of Building 42 (Hodder 2006, figs. 13–14; Sadarangani in press). These commemorative acts invent collective and individual memories and experiences (Hodder 2005a; Hodder & Pels 2010), and some of these actions were directed at certain individuals who may have been revered ancestors (Meskell 2008, 380). Intentionally burying human remains into the very foundation of a house and embedding animal parts into the house walls were activities that granted certain houses an importance or sociocultural value. Although these buried bones and other objects were invisible throughout the occupancy of the house, these actions were not only known to those involved with the activities but were also publicly witnessed by neighbours, and possibly by the wider community.

The performance of building

Within an established tradition of burying and hiding objects, mudbrick walls could be considered another venue for expression and social display by embedding meaning into the fabric of the house. The activities of burying an obsidian cache or placing a collection of objects in a post-retrieval pit may have only been experienced and witnessed by a select few people. The act of burying a human in a house, or later retrieval of head or other body parts, may have been a private event, although a human death would have been known throughout the community. Russell and colleagues (2009, 120) suggest that commemorative deposits of animal bones were 'private and presumably known to a smaller number of people', as opposed to the large installations of animal skulls and horns visibly mounted on the walls. House construction, on the other hand, was a public affair, with more opportunities for the social display.

Çatalhöyük houses were constantly being built by different groups, at different times. It was impossible to build a house without being seen by others, especially due to the streetless arrangement of houses (Düring 2001; 2007), where rooftops and ladders constituted the negotiation of constructed space: 'the levelling and infilling of old buildings, and construction of new buildings would have caused considerable upheaval and required at least some social co-operation with residents in adjacent buildings' (Matthews 2005a, 134). This mobility would have affected social interactions, as 'people would have regularly traversed the neighbourhood roof-scape on their way to and from their houses' (Düring 2007, 169). Whether or not neighbours were physically involved in house building, they would have witnessed and experienced the process in the public sphere. As the Çatalhöyük mound increased in height, the negotiation of space became increasingly constricted, requiring navigation of abandoned and occupied structures, in contrast with flat open settlement sites (Chapman 1990; Steadman 2000; Tringham 2000).

The processes of manufacture and construction were visual and textural transformations of a demolished house into newly constructed, domestic living space. It is also possible that the act of building may have been more symbolic than the finished form (see Cummings 2002, 257). The constant and repeated activities involved with construction projects could have reinforced social roles in a public setting. Here I have argued that the process and performance of construction is visible in mudbrick architecture through the choices of building materials and the sequences involved in building a house. Social process highlights that a house is never complete, and is deeply embedded in the everyday lives of the occupants. The process of building contributes to the experience of architecture by emphasizing the aspects of building through the consumption of materials. Yet, as invisible objects, mudbricks were made visible and meaningful through the performances of manufacture and construction.

Conclusions

The case study from Çatalhöyük has demonstrated that, within a limited range of mud materials, technical choices were present. Variations in mudbrick composition suggest that people create themselves through the houses they build, and that houses were as unique as the individuals who built them. The non-verbal communication of Neolithic architecture is spoken through the active role of the mudbrick recipe. Mudbricks were not only functional, mundane objects but were also intrinsic to the house, where buildings become an expressive vehicle for semi-autonomous social relationships, as seen with the 'map' wall painting (Fig. 8a). At Çatalhöyük, the house is one of the largest and most striking artefacts, and is arguably the focus of social life within the village. Matthew's (2005a,b) research has established the practice of using purpose-specific clays, so by extension the types of materials used in mudbrick architecture should also be considered. Ritual activities, such as feasting, surrounded the closing of a house and foundation deposits suggest an intentionality surrounding house construction; therefore is it plausible to suggest that meaning was invested into the very fabric of construction. Untangling the process of construction by exploring the public performance can access the meaning of the house.

The processes of both manufacture and construction afforded opportunities for expression: similarly coloured bricks have dissimilar compositions or different-coloured bricks and mortars were used between neighbouring houses. In this study, the visibility of mudbrick walls has been emphasized primarily because Çatalhöyük wall surfaces were not seen, hidden behind multiple layers of plaster, and remained invisible throughout the life-cycle of the house. The mudbrick as an invisible object continues to be active, positioned within the convention of purposefully buried objects. A mudbrick's performance ceased after the time of construction, yet its materiality endured. When the construction ends and dwelling begins, these objects continued to possess the meaning inherent to their origin, source, manufacture or ascribed value. Therefore, the process of mudbrick manufacture influences the final outcome of the house and the materials used in making mudbricks have meaning, even though the bricks are buried and unseen.

The house becomes an object through the process of its making, and in this instance, refers to the performance of manufacture and the various stages involved in constructing houses at Çatalhöyük. As mudbricks were actually 'invisible', there is a greater emphasis on the production process and various activities performed in the public sphere. The examples given here demonstrate how building materials contribute to the meaning of architecture and how meaning is culturally determined. The house, as an object, communicates through its materials. These combined processes were what built houses, or rather the performance of building houses builds people.

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References

Andrews, P., T. Molleson & B. Boz, 2005. The human burials at Çatalhöyük, in *Inhabiting Çatalhöyük: Reports from the 1995–99 Seasons*, ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 38.) Cambridge: McDonald Institute for Archaeological Research/ London: British Institute at Ankara, 261–78.

Atalay, S., 2005. Domesticating clay: the role of clay balls, mini balls and geometric objects in daily life at Çatalhöyük, in *Changing Materialities at Çatalhöyük: Reports from the 1995–99 Seasons*, ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 39.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 139–68.

Bachelard, G., 1997. The poetics of space, in *Rethinking Architecture: a Reader in Cultural Theory*, ed. N. Leach. London: Routledge, 85–97.

Bailey, D., 2005. Beyond the meaning of Neolithic houses: specific objects and serial repetition, in *(Un)settling the Neolithic*, eds. D. Bailey, A. Whittle & V. Cummings. Oxford: Oxbow Books, 90–97.

Bailey, D. & L. McFadyen, 2010. Built objects, in *Oxford Handbook of Material Cultural Studies*, eds. D. Hicks & M.C. Beaudry. Oxford: Oxford University Press, 562–86.

Barrett, J.C., 1994. *Fragments from Antiquity: an Archaeology of Social Life in Britain, 2900–1200* BC. (Social Archaeology.) Oxford: Blackwell.

Baxter, M.J., 1994. *Exploratory Multivariate Analysis in Archaeology*. Edinburgh: Edinburgh University Press.

Beck, R.A. (ed.), 2007a. *The Durable House: House Society Models in Archaeology*. Carbondale (IL): Centre for Archaeological Investigations.

Beck, R., 2007b. The durable house: material, metaphor, and structure, in *The Durable House: House Society Models in Archaeology*, ed. R.A. Beck. Carbondale (IL): Centre for Archaeological Investigations, 3–24.

van Beek, G.W. & O. van Beek, 2008. *Glorious Mud! Ancient and Contemporary Earthen Design and Construction in North Africa, Western Europe and the Near East and Southwest Asia*. Washington (DC): Smithsonian Institution Scholarly Press.

Benjamin, D.N. & D. Stea (eds.), 1995. *The Home: Words, Interpretations, Meanings and Environments*. Avebury: Aldershot.

Birdwell-Pheasant, D. & D. Lawrence-Zuñiga (eds.), 1999. *House Life: Space, Place and Family in Europe*. Oxford: Berg.

Blair, T.C. & J.G. McPherson, 1999. Grain-size and textural classification of coarse sedimentary particles. *Journal of Sedimentary Research* 69(1), 6–19.

Blanton, R.E., 1994. *Houses and Households: a Comparative Study*. (Interdisciplinary Contributions to Archaeology.) New York (NY): Plenum Press.

Blier, S.P., 1987. *The Anatomy of Architecture: Ontology and Metaphor in Batammaliba Architectural Expression*. Cambridge: Cambridge University Press.

Bloch, M., 2010. Is there religion at Çatalhöyük... or are there just houses? in *Religion in the Emergence of Civilization: Çatalhöyük as a Case Study*, ed. I. Hodder. Cambridge: Cambridge University Press, 146–62.

Boivin, N., 2000. Life rhythms and floor sequences: excavating time in rural Rajasthan and Neolithic Çatalhöyük. *World Archaeology* 31(3), 367–88.

Boivin, N., 2004. Mind over matter? Collapsing the mind–matter dichotomy in material culture studies, in *Rethinking Materiality: the Engagement of Mind with the Material World*, eds. E. DeMarrais, C. Gosden & C. Renfrew. (McDonald Institute Monographs.) Cambridge: McDonald Institute for Archaeological Research, 63–71.

Boivin, N., 2008. *Material Cultures, Material Minds: the Impact of Things on Human Thought, Society, and Evolution*. Cambridge: Cambridge University Press.

Boivin, N. & M.-A. Owoc (eds.), 2004. *Soils, Stones and Symbols: Cultural Perceptions of the Mineral World*. London: UCL Press.

Boyer, P., N. Roberts & D. Baird, 2006. Holocene environment and settlement on the Çarşamba alluvial fan, south-central Turkey: integrating geoarchaeology and archaeological field survey. *Geoarchaeology* 21(7), 675–98.

Bradley, R., 1993. *Altering the Earth: the Origins of Monuments in Britain and Continental Europe*. Edinburgh: Society of Antiquaries of Scotland.

Buchli, V. (ed.), 2002. *The Material Culture Reader*. Oxford: Berg.

Buchli, V., 2004. Material culture: current problems, in *A Companion to Social Archaeology*, eds. L. Meskell & R.W. Preucel. London: Blackwell, 180–94.

Buchli, V., 2006. Architecture and modernism, in *Handbook of Material Culture*, eds. C. Tilley, W. Keane, S. Küchler, M. Rowlands & P. Spyer. London: Sage Publications, 255–66.

Cameron, C., 1998. Coursed adobe architecture, style, and social boundaries in the American Southwest, in *The Archaeology of Social Boundaries*, ed. M.T. Stark. (Smithsonian Series in Archaeological Inquiry.) Washington (DC): Smithsonian Institution Press, 183–208.

Carsten, J. & S. Hugh-Jones (eds.), 1995. *About the House: Lévi-Strauss and Beyond*. Cambridge: Cambridge University Press.

Carter, T., 2007. Of blanks and burials: hoarding obsidian at Neolithic Çatalhöyük, in *Technical Systems and Near Eastern PPN Communities*, eds. L. Astruc, D. Binder & F. Briois. Antibes: 5th International Workshop, 343–55.

Cessford, C., 2001. A new dating sequence for Çatalhöyük. *Antiquity* 75, 717–25.

Cessford, C., 2005. Estimating the Neolithic population of Çatalhöyük, in *Inhabiting Çatalhöyük: Reports from the 1995–99 Seasons*, ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 38.) Cambridge: McDonald Institute for Archaeological Research/ London: British Institute at Ankara, 323–6.

Cessford, C., 2007. Building 1, in *Excavating Çatalhöyük: South, North, and KOPAL Area Reports from the 1995–99 Seasons*, ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 37.) Cambridge: McDonald Institute for

Archaeological Research/London: British Institute at Ankara, 405–530.

Chapman, J., 1990. Social inequality on Bulgarian tells and the Varna problem, in *The Social Archaeology of Houses*, ed. R. Samson. Edinburgh: Edinburgh University Press, 49–92.

Cieraad, I. (ed.), 1999. *At Home: an Anthropology of Domestic Space*. Syracuse (NY): Syracuse University Press.

Clark, D.R., 2003. Bricks, sweat and tears: the human investment in constructing a 'four-room' house. *Near Eastern Archaeology* 66(1–2), 34–43.

Connerton, P., 1989. *How Societies Remember.* (Themes in the Social Sciences.) Cambridge: Cambridge University Press.

Cummings, V., 2002. Experiencing texture and transformation in the British Neolithic. *Oxford Journal of Archaeology* 21(3), 249–61.

Cutting, M., 2005. The architecture of Çatalhöyük: continuity, household and settlement, in *Çatalhöyük Perspectives: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 40.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 151–69.

Davis, J.C., 1973. *Statistics and Data Analysis for Geologists*. New York (NY): John Wiley.

Dearing, J., 1994. *Environmental Magnetic Susceptibility: Using the Bartington MS2 System*. Oxford: Bartington Instruments Limited.

Dietler, M. & I. Herbich, 1998. *Habitus*, techniques, style: an integrated approach to the social understanding of material culture and boundaries, in *The Archaeology of Social Boundaries*, ed. M.T. Stark. (Smithsonian Series in Archaeological Inquiry.) Washington (DC): Smithsonian Institution Press, 232–63.

Doherty, C., 2013. Sourcing Çatalhöyük's clays, in *Substantive Technologies at Çatalhöyük: Reports from the 2002–2008 Seasons,* ed. I. Hodder. Los Angeles (CA): Cotsen Institute of Archaeology, 51–66.

Düring, B., 2001. Social dimensions in the architecture of Neolithic Çatalhöyük. *Anatolian Studies* 51, 1–18.

Düring, B., 2005. Building continuity in the central Anatolian Neolithic: exploring the meaning of buildings at Asıklı Höyük and Çatalhöyük. *Journal of Mediterranean Archaeology* 18(1), 3–29.

Düring, B., 2007. The articulation of houses at Neolithic Çatalhöyük, Turkey, in *The Durable House: House Society Models in Archaeology,* ed. R.A. Beck. Carbondale (IL): Centre for Archaeological Investigations, 130–53.

Eddisford, D., in press. Building 49, in *Çatalhöyük Excavations: the 2000–2008 Seasons,* ed. I. Hodder. Los Angeles (CA): Cotsen Institute of Archaeology.

Edwards, R., 2002. *Mud Brick Techniques*. 7th edition. Kuranda, Queensland: The Rams Skull Press.

Facey, W., 1997. *Back to Earth: Adobe Building in Saudi Arabia*. London: Al-Turath.

Fairbairn, A., E. Asouti, N. Russell & J.G. Swogger, 2005. Seasonality, in *Çatalhöyük Perspectives: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 40.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 93–108.

Farid, S., 2007a. Level IX relative heights, Building 2, Buildings 22 & 16 and Building 17, in *Excavating Çatalhöyük: South, North, and KOPAL Area Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 37.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 139–226.

Farid, S., 2007b. Level VII: Space 113, Space 112, Space 105, Space 109, Building 40, Space 106, Spaces 168 & 169, Buildings 8 & 20, Building 24 and relative heights of Level VII, in *Excavating Çatalhöyük: South, North and KOPAL Area Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 37.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 283–338.

Farid, S., 2007c. Level VIII: Space 161, Space 162, Building 4, Space 115, Buildings 21 & 7, Building 6 and relative heights of Level VIII, in *Excavating Çatalhöyük: South, North and KOPAL Area Reports from the 1995–99 Seasons*, ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 37.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 227–82.

Gale, S.J. & P.G. Hoare, 1991. *Quaternary Sediments: Petrographic Methods for the Study of Unlithified Rocks*. New York (NY): Halsted Press.

Garrison, E.G., 2003. *Techniques in Archaeological Geology.* (Natural Science in Archaeology.) Berlin: Springer.

Gillespie, S.D., 2000. Lévi-Strauss: *Maison* and *Société a maisons*, in *Beyond Kinship: Social and Material Reproduction in House Societies*, eds. R.A. Joyce & S.D. Gillespie. Philadelphia (PA): University of Pennsylvania Press, 22–52.

Gillespie, S.D., 2007. When is a house? in *The Durable House: House Society Models in Archaeology*, ed. R.A. Beck. Carbondale (IL): Centre for Archaeological Investigations, 25–50.

Goldberg, P. & R.I. Macphail, 2006. *Practical and Theoretical Geoarchaeology.* Oxford: Blackwell.

Gosselain, O.P., 1994. Skimming through potters' agendas: an ethnoarchaeological study of clay selection strategies in Cameroon, in *Society, Culture, and Technology in Africa*, ed. S.T. Childs. Philadelphia (PA): University of Pennsylvania Museum of Archaeology and Anthropology, 99–107.

Hendon, J.A., 2010. *Houses in a Landscape: Memory and Everyday Life in Mesoamerica.* Durham (NC): Duke University Press.

Hodder, I., 1994. Architecture and meaning: the example of Neolithic houses and tombs, in *Architecture and Order: Approaches to Social Space,* eds. M. Parker Pearson & C. Richards. London: Routledge, 67–88.

Hodder, I., 1996a. Çatalhöyük: 9000 year old housing and settlement in central Anatolia, in *Housing and Settlement in Anatolia: a Historical Perspective,* ed. Y.

Sey. Istanbul: Turkiye Ekonomik ve Toplumsal Tarih Vakfi, 43–8.

Hodder, I. (ed.), 1996b. *On the Surface: Çatalhöyük 1993–95.* (McDonald Institute Monographs/BIAA Monograph 22.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara.

Hodder, I., 2005a. Memory, in *Çatalhöyük Perspectives: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 40.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 183–96.

Hodder, I., 2005b. Peopling Çatalhöyük and its landscape, in *Inhabiting Çatalhöyük: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 38.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 1–30.

Hodder, I., 2006. *The Leopard's Tale: Revealing the Mysteries of Çatalhöyük.* New York (NY): Thames and Hudson.

Hodder, I., 2007a. Çatalhöyük in the context of the Middle Eastern Neolithic. *Annual Review of Anthropology* 36, 105–20.

Hodder, I., 2007b. Summary of results, in *Excavating Çatalhöyük: South, North and KOPAL Area Reports from 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 37.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 25–37.

Hodder, I. (ed.), 2010. *Religion in the Emergence of Civilization: Çatalhöyük as a Case Study*. Cambridge: Cambridge University Press.

Hodder, I., 2011. Human-thing entanglement: towards an integrated archaeological perspective. *Journal of the Royal Anthropological Institute* 17, 154–77.

Hodder, I. & C. Cessford, 2004. Daily practice and social memory at Çatalhöyük. *American Antiquity* 69(1), 17–40.

Hodder, I. & P. Pels, 2010. History houses: a new interpretation of architectural elaboration at Çatalhöyük, in *Religion in the Emergence of Civilization: Çatalhöyük as a Case Study*, ed. I. Hodder. Cambridge: Cambridge University Press, 163–86.

Houben, H. & H. Guillaud, 2005. *Earth Construction: a Comprehensive Guide.* Bourton-on-Dunsmore: ITDG Publishing.

Hunter, T., 1965. Building with Adobe and Stabilized Earth Blocks. U.S. Department of Agriculture, Leaflet No. 535.

Ingold, T., 2000. Making culture and weaving the world, in *Matter, Materiality and Modern Culture,* ed. P.M. Graves-Brown. London: Routledge, 50–71.

Ingold, T., 2007. Materials against materiality. *Archaeological Dialogues* 14(1), 1–16.

Inomata, T. & L.S. Coben (eds.), 2006. *Archaeology of Performance: Theaters of Power, Community and Politics.* (Archaeology in Society.) Lanham (MD): Altamira Press.

Johnson, M., 2010. *English Houses 1300–1800: Vernacular Architecture, Social Life.* London: Pearson Education.

Jones, A., 2004. Archaeometry and materiality: materials-based analysis in theory and practice. *Archaeometry* 46(3), 327–38.

Joyce, R.A. & S.D. Gillespie (eds.), 2000. *Beyond Kinship: Social and Material Reproduction in House Societies*. Philadelphia (PA): University of Pennsylvania Press.

Kamp, K.A., 1993. Towards an archaeology of architecture: clues from a modern Syrian village. *Journal of Anthropological Research* 49(4), 293–317.

Kamp, K., 2000. From village to tell: household ethnoarchaeology in Syria. *Near Eastern Archaeology* 63(2), 84–93.

Keefe, L., 2005. *Earth Building: Methods and Materials, Repair and Conservation*. London: Taylor & Francis.

Kopytoff, I., 1988. The cultural biography of things: commoditization as process, in *The Social Life of Things: Commodities in Cultural Perspective,* ed. A. Appadurai. Cambridge: Cambridge University Press, 64–91.

Krause, R.A., 1985. *The Clay Sleeps: an Ethnoarchaeological Study of Three African Potters.* Tuscaloosa (AL): The University of Alabama Press.

Lane, P., 1994. The temporal structuring of settlement space among the dogon of Mali: an ethnoarchaeological study, in *Architecture and Order: Approaches to Social Space,* eds. M. Parker Pearson & C. Richards. London: Routledge, 196–216.

Last, J., 2005. Pottery from the East Mound, in *Changing Materialities at Çatalhöyük: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monogaph 39.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 101–38.

van der Leeuw, S.E., 1993. Giving the potter a choice: conceptual aspects of pottery techniques, in *Technological Choices: Transformation in Material Cultures since the Neolithic*, ed. P. Lemonnier. London: Routledge, 238–88.

Lemonnier, P. (ed.), 1993. *Technological Choices: Transformation in Material Cultures since the Neolithic.* London: Routledge.

Lévi-Strauss, C., 1979. *La voie des masques.* Paris: Plon.

Love, S., 2012. The geoarchaeology of mudbricks in architecture: a methodological study from Çatalhöyük, Turkey. *Geoarchaeology* 27(2), 140–56.

Love, S., 2013. An archaeology of mudbrick houses from Çatalhöyük, in *Substantive Technologies at Çatalhöyük: Reports from the 2000–2008 Seasons,* ed. I. Hodder. Los Angeles (CA): Cotsen Institute of Archaeology, 81–96.

Lucas, G., 2001. *Critical Approaches to Fieldwork: Contemporary and Historical Archaeological Practice.* London: Routledge.

Matthews, W., 2005a. Life-cycle and life-course of buildings, in *Çatalhöyük Perspectives: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 40.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 125–49.

Matthews, W., 2005b. Micromorphological and microstratigraphic traces of uses and concepts of space, in *Inhabiting Çatalhöyük: Reports from the 1995–99 Seasons*, ed. I. Hodder. (McDonald Institute Monographs/BIAA

Monograph 38.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 355–98.

Matthews, W. & S. Farid, 1996. Exploring the 1960s' surface: the stratigraphy of Çatalhöyük, in *On the Surface: Çatalhöyük 1993–95,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 22.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 271–300.

Matthews, W., M. Almond, E. Anderson, J. Wiles, H. Stokes & J. Rowe, 2013. Biographies of architectural materials and buildings: integrating high-resolution microanalysis and geochemistry, in *Substantive Technologies at Çatalhöyük: Reports from the 2000–2008 Seasons,* ed. I. Hodder. Los Angeles (CA): Cotsen Institute of Archaeology, 113–32.

McFadyen, L., 2006. Material culture as architecture: Neolithic long barrows in southern Britain. *Journal of Iberian Archaeology* 8, 91–102.

Meece, S., 2006. A bird's eye view – of a leopard's spots. The Çatalhöyük 'map' and the development of cartographic representation in prehistory. *Anatolian Studies* 56, 1–16.

Mellaart, J., 1967. *Çatal Hüyük: a Neolithic Town in Anatolia*. New York (NY): McGraw-Hill.

Meskell, L., 2008. The nature of the beast: curating animals and ancestors at Çatalhöyük. *World Archaeology* 40(3), 373–89.

Meskell, L., C. Nakamura, R. King & S. Farid, 2008. Figured lifeworlds and depositional practices at Çatalhöyük. *Cambridge Archaeological Journal* 18(2), 139–61.

Middleton, W.D., T.D. Price & D.C. Meiggs, 2005. Chemical analysis of floor sediments for the identification of anthropogenic activity residues, in *Inhabiting Çatalhöyük: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 38.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 399–412.

Miller, D., 2008. *The Comfort of Things.* Cambridge: Polity Press.

Miller, D. & S. Woodward, 2012. *Blue Jeans: the Art of the Ordinary.* Berkeley (CA): University of California Press.

Minke, G., 2006. *Building with Earth: Design and Technology of a Sustainable Architecture.* Boston (MA): Birkhauser – Publishers for Architecture.

Mitchell, J., 2006. Performance, in *Handbook of Material Culture,* eds. C. Tilley, W. Keane, S. Küchler, M. Rowlands & P. Spyer. London: Sage Publications, 384–401.

Morris, R., 2004. *The Archaeology of Buildings.* Stroud: Tempus.

Nakamura, C., 2010. Magical deposits at Çatalhöyük: a matter of time and place?, in *Religion in the Emergence of Civilization: Çatalhöyük as a Case Study,* ed. I. Hodder. Cambridge: Cambridge University Press, 300–331.

Norberg-Schulz, C., 1980. *Genius Loci: Towards a Phenomenology of Architecture.* New York (NY): Rizzoli.

Pallasmaa, J., 2005. *The Eyes of the Skin: Architecture and the Senses*. Chichester: John Wiley.

Pels, P., 2010. Temporalities of 'religion' at Çatalhöyük, in *Religion in the Emergence of Civilization: Çatalhöyük as a Case Study,* ed. I. Hodder. Cambridge: Cambridge University Press, 220–67.

Pfaffenberger, B., 1999. Worlds in the making: technological activities and the construction of intersubjective meaning, in *The Social Dynamics of Technology: Practice, Politics and World Views,* eds. M.-A. Dobres & C.R. Hoffman. Washington (DC): Smithsonian Institution Press, 147–64.

Rapoport, A., 1969. *House Form and Culture.* (Foundations of Cultural Geography.) Upper Saddle River (NJ): Prentice Hall.

Rapoport, A., 1982. *The Meaning of the Built Environment: a Nonverbal Communication Approach.* London: Sage Publications.

Rasmussen, S.E., 1962. *Experiencing Architecture.* Cambridge (MA): The MIT Press.

Regan, R. & J. Taylor, in press. The sequence of Buildings 75, 65, 56, 69, 44 and 10 and external Spaces 119, 129, 130, 144, 299, 314, 319, 329, 333, 339, 367, 371 and 427, in *Çatalhöyük Excavations: the 2000–2008 Seasons,* ed. I. Hodder. Los Angeles (CA): Cotsen Institute of Archaeology.

Richards, C., 1990. The late Neolithic house in Orkney, in *The Social Archaeology of Houses*, ed. R. Samson. Edinburgh: Edinburgh University Press, 111–24.

Richards, C., 1996. Monuments as landscape: creating the centre of the world in late Neolithic Orkney. *World Archaeology* 28(2), 190–208.

Ritchey, T., 1996. Note: building complexity, in *On the Surface: Çatalhöyük 1993–95,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 22.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 7–17.

Roberts, N. & A. Rosen, 2009. Diversity and complexity in early farming communities of southwest Asia: new insights into the economic and environmental basis of Neolithic Çatalhöyük. *Current Anthropology* 50(3), 393–402.

Rosen, A. & N. Roberts, 2005. The nature of Çatalhöyük: people and their changing environments on the Konya Plain, in *Çatalhöyük Perspectives: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 40.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 39–53.

Russell, N. & L. Martin, 2005. Çatalhöyük mammal remains, in *Inhabiting Çatalhöyük: Reports from 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 38.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 33–98.

Russell, N. & S. Meece, 2005. Animal representations and animal remains at Çatalhöyük, in *Çatalhöyük Perspectives: Reports from the 1995–99 Seasons,* ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 40.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 209–30.

Russell, N., L. Martin & K.C. Twiss, 2009. Building memories: commemorative deposits at Çatalhöyük. *Anthropozoologica* 44(1), 103–25.

Sadarangani, F., in press. The sequence of Buildings 53 and 42 and external Spaces 259, 260 and 261, in *Çatalhöyük Excavations: the 2000–2008 Seasons*, ed. I. Hodder. Los Angeles (CA): Cotsen Institute of Archaeology.

Seeher, J., 2007. *A Mudbrick City Wall at Hattuša: Diary of a Reconstruction*. Istanbul: Ege Yayinlari.

Shanks, M., 2004. Three rooms: archaeology and performance. *Journal of Social Archaeology* 4(2), 147–80.

Sillar, B. & M.S. Tite, 2000. The challenge of 'technological choices' for materials science approaches in archaeology. *Archaeometry* 42(1), 2–20.

Steadman, S.R., 1996. Recent research in the archaeology of architecture: beyond the foundations. *Journal of Archaeological Research* 4(1), 51–93.

Steadman, S.R., 2000. Spatial patterning and social complexity on prehistoric Anatolian *tell* sites: models for mounds. *Journal of Anthropological Archaeology* 19(2), 164–99.

Stein, J.K., 1984. Organic matter and carbonates in archaeological sites. *Journal of Field Archaeology* 11, 239–46.

Stewart, K., 2007. *Ordinary Affects*. Durham (NC): Duke University Press.

Strelitz, Z., 2008. *Buildings that Feel Good*. London: Riba Publishing.

Tan, C.-K., 2001. Building conjugal relations: the devotion to houses amongst the Paiwan of Taiwan, in *Home Possessions: Material Culture Behind Closed Doors*, ed. D. Miller. Oxford: Blackwell, 149–72.

Tilley, C., 2004. *The Materiality of Stone: Explorations in Landscape Phenomenology*. Oxford: Berg.

Tringham, R., 2000. The continuous house: a view from the deep past, in *Beyond Kinship: Social and Material Reproduction in House Societies*, eds. R.A. Joyce & S.D. Gillespie. Philadelphia (PA): University of Pennsylvania Press, 115–34.

Tung, B., 2005. A preliminary investigation of mud brick at Çatalhöyük, in *Changing Materialities at Çatalhöyük: Reports from the 1995–99 Seasons*, ed. I. Hodder. (McDonald Institute Monographs/BIAA Monograph 39.) Cambridge: McDonald Institute for Archaeological Research/London: British Institute at Ankara, 215–19.

Twiss, K.C., A. Bogaard, D. Bogdan *et al.*, 2007. Arson or accident? The burning of a Neolithic house at Çatalhöyük, Turkey. *Journal of Field Archaeology* 33, 41–57.

Whittle, A., 1996. Houses in context: buildings as process, in *Neolithic Houses in Northwest Europe and Beyond*, eds. T. Darvill & J. Thomas. Oxford: Oxbow Books, 13–26.

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