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The clay world of Çatalhöyük

This study examines the fundamental role of clay in the development of an important Neolithic community. Clay was an essential raw material at Çatalhöyük but it was also influential in several other ways, as yet largely un-documented. The aim of this work is to offer a more balanced view, to show the material culture was only the more conspicuous expression of clay's contribution the site. In particular, this study examines the relationship between landscape and materials and how this evolved as the tell and its population grew.

Çatalhöyük is located on the clay-rich Konya Plain of central Anatolia (figure 1.1). It became by far the largest Neolithic settlement of the region and at its peak has an estimated population of between three and eight thousand (Cessford, 2005). Clay figured extensively in the material culture while the clay-dominated landscape allowed this early agricultural community to flourish. Both clay materials and landscape have been widely studied, though usually in isolation of each other and with materials research projects usually only concerned with single artefact groups. The focus of this study is the interrelationship between all clay materials and the clay-rich landscape, in recognition that a full understanding of what it meant to be living with clay requires this holistic approach. The aim is to explore how clay factored into everyday life and how it contributed to Çatalhöyük's obvious success.

There are two principal reasons for this new focus. First because in choosing this location Çatalhöyük's people made themselves very dependent on clay, since the site lies on the clay-rich bed of the extensive former Pleistocene Lake Konya (Fontugne, 1999) and lacked a local source of stone. Second, because clay had a dual role at Çatalhöyük (figure 1.2), being both a raw material and a main component of the landscape: there are unresolved contradictions.

Figure 1.1. The Neolithic East Mound of Çatalhöyük. Main image: imagesandstories.com

Clay appears to be at the heart of a major paradox that seemingly opposed Çatalhöyük's choice of location and obvious success (Doherty, 2013). This arises because the impermeable clays of the former lake bed are thought to have impeded the drainage of seasonal floodwaters, producing a landscape of extensive wetlands. Obviously such a setting would have been unsuitable for cereal-based agriculture yet this is known to have been widely practiced at Çatalhöyük (Roberts, 2009; Fairbairn, 2005). As an explanation it has been suggested that the site was not primarily located for optimal agricultural production but for non-subsistence reasons: mainly that it could supply the clays needed for elaboration of the house (Hodder, 2006, p. 79). This is an important claim since it elevates clay's status from the ordinary to one of sufficient importance to seemingly override basic subsistence requirements at Çatalhöyük.

The research presented her aims to resolve this paradox by showing how clay use reflected an evolving relationship between material culture and landscape. It shows how the favourable properties of local clays led to their widespread use and to extraction on a scale that began to alter the immediate landscape.

Clay in the Neolithic - why study?

Clay had become increasingly important by the Neolithic. While this basic raw material had been used throughout prehistory the scale of its use increased significantly when people began to settle down. Permanent houses at sites such as Çatalhöyük would have required considerable amounts of clay to construct, after which features such as floors, plaster linings, hearths and storage bins needed constant maintenance. The arrival of pottery would have challenged the house-based traditions of raw material procurement because of the different technical requirements of this new pyrotechnology. As settlement size increased in the Neolithic (Kuijt, 2008; Barker, 2006, p. 400) and with an increasing diversity and sophistication of clay use, people's engagement with this basic raw material would have moved to a new level.

There is another, less obvious implication of this increased usage that is relevant to a large, focal settlement such as Çatalhöyük, but not to its smaller predecessors. The building of a large number of mudbrick houses meant that the cumulative volume of clay extracted around the settlement would have been significantly greater than for earlier sites, introducing the opportunity for new interactions with the local landscape and for potential conflict with other land use activities. At sites such as Çatalhöyük, the scaled-up use of clay would influence a

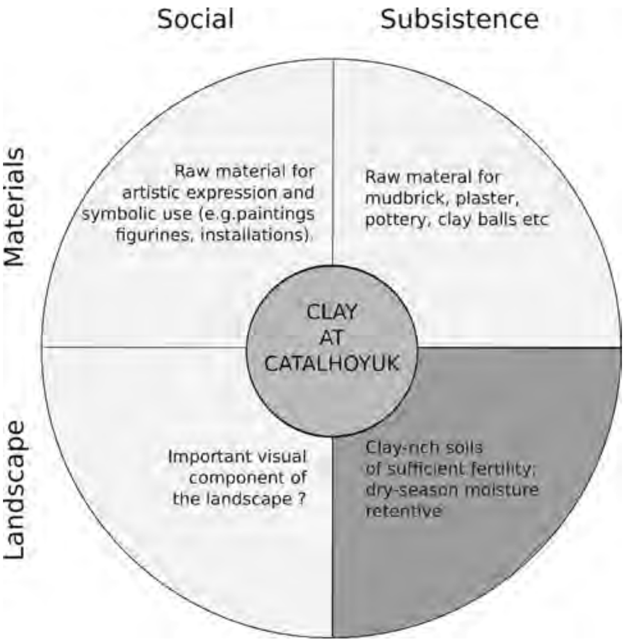

Figure 1.2. Clay's diverse role at Çatalhöyük.

community beyond its material culture, for example by impacting on drainage and agriculture.

Situating Çatalhöyük

Çatalhöyük's name means "forked-mound". It consists of two tells lying a few hundred metres apart that are separated today by the Çarşamba river (figure 1.3), of which a forerunner is thought to have flowed close to the west side of the East Mound during its occupation (Mellaart, 1975, p. 99). The very low gradient of the Konya Plain meant that during the Holocene this alluvial system transported mainly fine sediment and the clay world of Çatalhöyük was a direct consequence this alluvial style. Rising twenty-one metres above the surrounding plain, the Neolithic East Mound was occupied continuously from 7100 to 5950 cal BC (Bayliss, 2015). At least eighteen levels of occupation are recognised, with a significant feature being the absence of streets or open spaces between the buildings. Throughout most of the occupation period houses were simply constructed back-to-back. Access was via the roof areas which were also important places for many household activities. This arrangement persisted until the upper levels when open spaces began to appear and houses became less densely packed (Marciniak, 2015). The more open architectural style continued into the Chalcolithic at the smaller West Mound, which was occupied between 6000 and 5600 cal BC (Biehl, 2012). Until recently it was thought that there had been a hiatus between the occupations of the two mounds but new dating now shows a brief overlap of some fifty to a hundred years.

The East Mound currently covers thirteen hectares (Hodder, 2006, p.7) but originally would have extended a little beyond the modern boundaries. Roberts has demonstrated that the lower slopes have been buried by

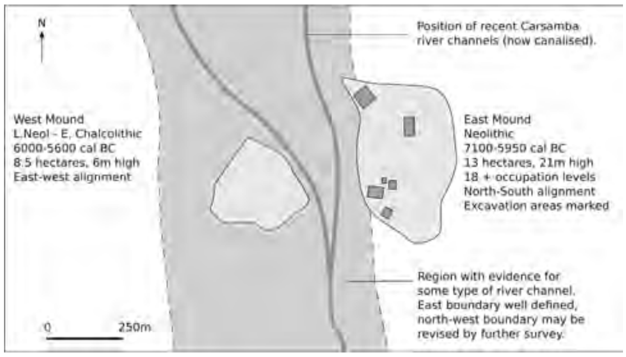

Figure 1.3. Çatalhöyük's two mounds

up to two or three metres of alluvium mixed with colluvial deposits derived from the mound (Roberts, 1982), countering previous claims that the modern East Mound represents its original size (Cohen, 1970). Details of the site's origins are not known in full because excavations have not uncovered the first houses. The deepest levels accessed so far are re-worked midden material lying on the natural lake clay bed and interpreted as off-site dumping and penning areas (Farid, 2007). These were assigned to the lowest level, Level XII, of the stratigraphy established by James Mellaart who conducted the first series of excavations at Çatalhöyük during the 1960s (Mellaart, 1967; Bayliss, 2015). Mellaart's system of levels has since been replaced by a new stratigraphy developed during more recent excavations lead by Ian Hodder (Hodder, 2014). Table 1.1 shows the relationship between the two systems.

Table 1.1. The Mellaart and Hodder stratigraphies. Source: Hodder (2014).

Levels		Years calibrated BC
Mellaart	Hodder | South - North	
0,I,II	TP + TPC	6400-6000
	South T - 4040 J	
	South S - 4040 J	
	South R - 4040 I	
	South Q - 4040 H	
(V)	South P - 4040 H	
VIA	South O - 4040 G	6500-6400
VIB	South N - 4040 G	
VII	South M - 4040 F	6700-6500
VIII	South L - 4040 F	
IX	South K	
X	South JPre-XII	
XI	South I	7100-6800
XII	South H	
Pre-XII	South G1, G2, G3, G4	

The regional context

Çatalhöyük sits on the southern part of the Konya Plain, a large inland basin located in the southwest of the Anatolian Plateau (figure 1.4). This upland plateau block lies immediately northwest of the Levant and west of Mesopotamia to form a major physiographic unit of the Near East region. The East Mound was occupied throughout the 8th and 7th millennia BC, i.e. relatively late in comparison to early sedentary settlements in the Middle East (Hodder, 2007) that emerged between the twelfth and ninth millennia BC. Much of the symbolism and continuous remodelling associated with house elaboration at Çatalhöyük has been traced back towards the PPNA of the Levant, and it seems logical to look for a direct transmission of clay use from these distant eastern sites. On the other hand, sedentism throughout the Middle East and Anatolia is seen as having been a polycentric process (Hodder, 2007) and so there is no real obligation to assume a wholesale inheritance. Given that the lake bed setting of Çatalhöyük differs from that of most Middle Eastern sites, it is perhaps more useful to restrict this contextual review just to the Anatolian Plateau.

Çatalhöyük descended from a line of settlements that showed distinctive Anatolian Plateau characteristics in their subsistence strategies and attention to a range of symbolic and ritual practices (Baird, 2007). Baird sees a clear cultural linkage between the Late Epipalaeolithic, Aceramic Neolithic and Ceramic Neolithic periods for this region and argues that, unlike the Levantine PPNB, there is no evidence for population interruption between the Aceramic and the Ceramic Neolithic on the Anatolian Plateau but instead a continued transmission of cultural and subsistence characteristics. The lithic technology and practice of skull removal at the late Epipaleolithic site of Pinarbaşı, situated 25 kilometres southeast of Çatalhöyük (figure 1.4) suggests to Baird that connections with Northern Levant were still important at this time. By the next occupation phase of Pinarbaşı, (c.9000-7800 cal BC) there is the first evidence for sedentism in the region, but this does not copy the Levantine/northern Mesopotamian model of reliance on intensive cereal production and horticulture. Instead, early sedentism at Pinarbaşı, is based on pre-existing practices including the hunting of large herbivores, practices that to Baird show a distinctly Anatolian Plateau inheritance. The second phase of occupation at Pinarbaşı, provides the first known use of clay on the Konya Plain, in the form of semi-subterranean oval shaped structures with plastered surfaces (Baird, 2007). These are not recorded as being based on fired-lime plaster, which is the Levantine PPNB tradition (Kingery, 1988; Clarke, 2012), so we can tentatively assume they are simply the natural white marls (calcareous clays) which are such a distinctive feature of the Konya Plain.

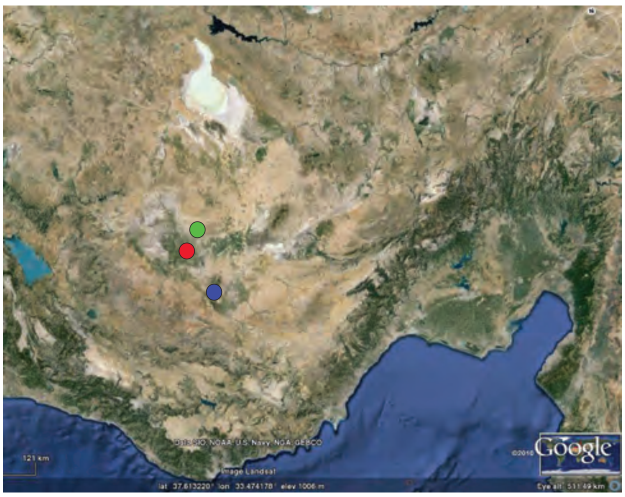

Figure 1.4. The Anatolian Plateau location of Çatalhöyük (red circle), Pinarbaşı (blue) and Boncuklu (green).

Importantly, Baird's work at Pinarbaşı frees us from having to think of clay use at Çatalhöyük as a straight copy of Levantine practices, by recognising that an Anatolian Plateau style had long been in development. The expectation that Levantine-based traditions should necessarily exist at Çatalhöyük risks introducing a bias to the interpretation of clay use. For example, claims for a burnt lime pyrotechnology in the early levels of the East mound (Mellaart, 1966; Matthews, 2005) seem to have been influenced by the expectation of PPNB-type lime use. The actual evidence has since been disputed on both petrographic and technological fronts, a point that will be discussed in detail later.

Another team led by Baird is currently excavating the small but very important Aceramic Neolithic site of Boncuklu, which was occupied slightly earlier than Çatalhöyük (from c.8500-7500 BC) and is situated just under ten kilometres to the north (figure 1.4) (Baird, 2012). The inhabitants of this marginal wetland site hunted wild cattle (aurochs), but also practiced some cereal growing. Houses still had an oval plan but now showed much of the elaborate symbolism that was later to become a hallmark of Çatalhöyük. For example, Boncuklu houses were constructed of mudbrick and used marl plaster of different purities to demarcate 'clean' (white) and 'dirty' (off-white) zones. Clay was also a sculptural element, being used most notably for bucrania installations (plaster-modelled wild cattle horns).

What the excavations at Boncuklu and Pinarbaşı clearly show is that a significant part of Çatalhöyük's tradition of using clay had been in development at earlier sites on the Konya Plain. But in acknowledging this legacy it is important not to simply accept the patterns of clay use at Çatalhöyük as a direct scaling-up of existing regional traditions. The later chapters will show how the much larger size of Çatalhöyük, combined with certain characteristics of its location, gave rise to complex relationships between the tell and the immediate landscape. These interactions shaped clay use at Çatalhöyük in a way unlikely to have been experienced by earlier settlements on the Konya Plain, all of which were much smaller (Baird, 2002).

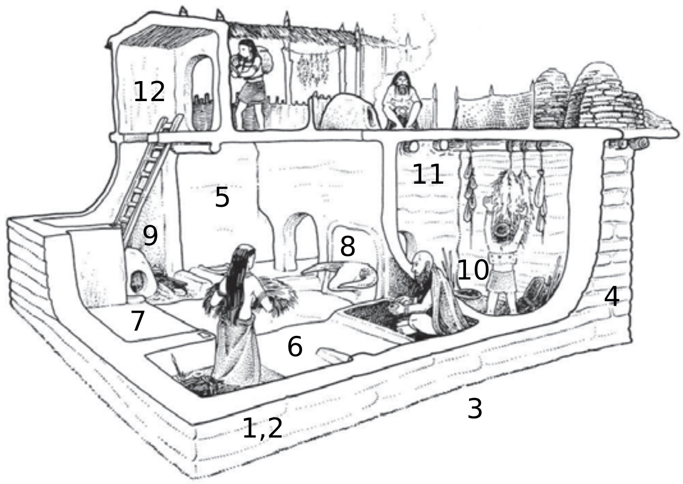

Figure 1.5. Clay was widely used in Çatalhöyük houses. Image (adapted): Çatalhöyük Research Project.

A familiarity with clay

Although Çatalhöyük's choice of location necessitated a reliance on clay from the outset, the community's success clearly shows that this was not a disadvantage. The Konya Plain was populated by semi-mobile groups long before the Neolithic and sites such as Boncuklu compensated the lack of local sources of stone by fully utilising clay. When people chose to settle at Çatalhöyük it makes no sense to think that they had to make the best of a poor situation. Figure 1.5 summarises clay use in a typical mid-occupation house, such as Building 77 (figure 1.6). What is obvious from the quality of even the earliest buildings, with their plastered walls and painted floors, is that the community was already very familiar with clay and could skilfully exploit this versatile raw material for a wide variety of domestic and symbolic uses.

Figure 1.6. Elaborate use of clay in Building 77. Non-specific pale buff silty clays are used for mudbricks, mortar and the floor levels. High purity white marl is restricted for the raised burial platform and modelled bucrania, and the walls with modelled calf skull (centre of wall above niche). Image: Çatalhöyük Research Project.

All Çatalhöyük houses were constructed of mudbricks lined with a variety of earthen plasters. It is thought that cooking was initially performed by placing food amongst heated clay balls, either in hearth structures or perhaps in clay-lined baskets or hides (Atalay, 2003). Over time, technological advances saw a more selective use of clay. Mudbricks became progressively sandier, providing greater load-bearing strength; roofs were lined with a type of clay that set quickly to give a hard durable surface (Stevanović, 2011); and shaped pieces of gritty clay were fire-hardened for use as whetstones and abraders as an effective workaround in the absence of local groundstone sources (Ketchum, 2009, pp. 118-120). However, attempts to make cooking wares from local clays appear to have been abandoned and preference given instead to wares from adjacent regions (Doherty, 2013).

Clay also featured widely in symbolism at Çatalhöyük. In some cases, there is clear evidence for fixed patterns of clay use, such as for the house interiors during the early and middle periods (to about 6600 and 6200 cal BC respectively). These were lined with whitish calcareous clays (marls), but the purest white varieties were reserved for special areas such as the floor platforms that contained adult burials. Paintings in red ochre and cinnabar were hidden by thin coats of white clay, and there is evidence that the images were revealed and covered up on multiple occasions during the house's occupation (Hodder, 2006, p.190). White marl clay was also used extensively for mouldings, sometimes of bas-relief animals such as leopards or bears, sometimes as the basal part of bucrania installations. As with many other Neolithic sites, figurines are well represented at Çatalhöyük and are mostly made of clay, though there seems to have been no fixed rules for which raw material could be used.

Specialist studies of these materials have already demonstrated the important and varied role played by clay in both the spheres of subsistence and symbolism at Neolithic Çatalhöyük. But attention has tended to be drawn into the clay world of the house at the expense of the clay landscape that gave rise to and supported house life. The more holistic approach of this study aims to establish a fuller view of clay at Çatalhöyük. However, in doing so it must first address the long-standing paradox that has disconnected our understanding of the site from its true clay world.

A clay paradox

Living with clay at Çatalhöyük had consequences beyond just the supply of raw material for material culture needs. Returning to the paradox briefly outlined earlier, we have seen that the community relied significantly on domesticated cereals which in turn relied on there being suitable land (Fairbairn, 2005). But according to geomorphological and paleoenvironmental modelling of the contemporary environment by the Konya Basin Palaeoenvironmental Research Program (KOPAL), a major survey undertaken between 1995 and 1999 (Roberts, 1999), the site would have been surrounded by a vast seasonal wetland, making it wholly unsuitable for cereal production at the necessary scale.

The proponents of this model argue that floods from the annual snow-melt in the southern mountains would have turned Çatalhöyük into a virtual island for as much as two months of every spring (Roberts, 2009). Such conditions would have severely damaged any autumn-sown cereals, and there would have been no spring-sown alternative because domesticated cereals had not yet been developed with the necessary traits (vernalisation insensitivity) (Blumer, 2009). Roberts and Rosen's solution was to propose a somewhat extreme model of remote cereal production in fields over twelve kilometres away (figure 1.7). A paradox arises because the clay beds that were versatile raw materials also impacted negatively on cereal growing by impeding flood water drainage to give the seasonal wetlands. As noted, attempts to resolve the issue have instead begun to foreground the importance of the wetland landscape itself. For example, Hodder's argument in response to this environmental constraint is that the choice of location reflects the socio-cultural need for clays (Hodder, 2006, p.88), implying that their use for the symbolic elaboration of the house was of paramount importance. 'The social and cultural factors involved in the need for different types of clay were part of a larger mix of factors leading to the particular location of Çatalhöyük....The suite of practical and symbolic factors was in the end more important than simple questions such as the closeness to the agricultural fields.'

But just how unique were Çatalhöyük's clays? From general accounts of the Southern Konya Plain we might expect the same combination of clays to be widely available and not restricted to Çatalhöyük (De Ridder, 1965; De Meester, 1970). Indeed, choosing a location much closer to the edge of the former Lake Konya should have allowed access to the same clays while also being nearer to what proponents of the extensive wetland model consider to have been the only dry ground capable of supporting cereal production. Rather than solving the paradox, explanations such as this simply raise a different one, not least because they oversimplify. Neither wetland environments nor clay deposits should be considered in terms of simple generic models as both are complex natural systems. I argue that the excavations themselves question the accuracy of the KOPAL wetland model and that the true nature of the local clays still needs to be firmly established for their full influence at Çatalhöyük is to be evaluated correctly.

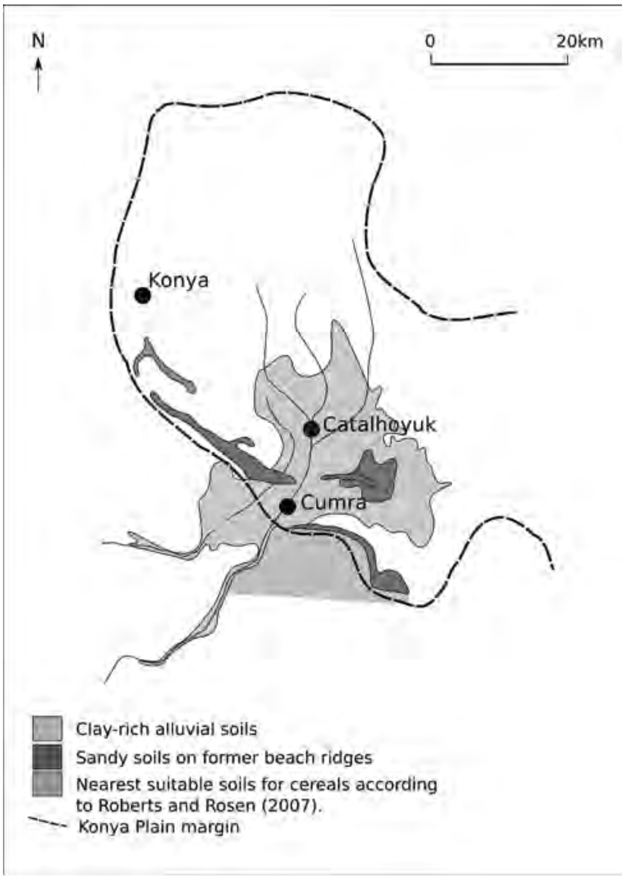

Figure 1.7. Remote cereal production.

For example, standing at the top of the exposed section of the South Area of the East Mound, the observer is able to scan through multiple levels of occupation and see marked colour changes in the architecture. The earliest levels have walls made of dark grey or black mudbricks but these were abruptly replaced by reddish-brown bricks from South M onward (figure 1.8). Dark colours in clays are produced either by relatively high organic matter content or the presence of iron compounds in their reduced (ferrous) state. Usually these two conditions develop together when predominately wet conditions exclude air and so favour the preservation of dark organic matter and prevent iron from oxidising to its red coloured ferric form (Vepraskas, 2001 p.88).

Figure 1.8. Predominantly orange-buff mudbricks in the South Area. Dark mudbricks occur only below South M (below the tops of the wooden shoring in the lower-centre) and are conspicuous by their thick white mortars. Image: Çatalhöyük Research Project

The early mudbricks closely match the Holocene alluvial dark clays that are found directly above the white marl in a wide area around Çatalhöyük, and which are referred to as the 'Lower Alluvium' in the KOPAL Project's stratigraphy (figure 1.9) (Boyer, 2006).

The Lower Alluvium deposits have been interpreted as *backswamp* clays (De Meester, 1970: p.82), a backswamp being a flood-prone area of an alluvial system typified by the accumulation of very fine sediments (Reading, 1986, p.42). However, this immediately raises two questions: just how did people extract such large quantities of clay from a wetland without making it even wetter? And, how can we account for the permanent switch to reddish clays that occurs at South M, colours that do not indicate similar waterlogged conditions? This dramatic and sustained change in mudbrick colour is obviously signalling something important but cannot be understood in the context of the current landscape interpretation. In order to account for the observed patterns of clay use it is therefore essential to critically re-evaluate the evidence for Çatalhöyük's wetland.

A holistic clay materials-clay landscape approach

The long history of research at Çatalhöyük has produced many specialised studies of the individual clay artefact groups (Love, 2010; Tung, 2008; Last, 2005; Atalay, 2003). However, to understand how Çatalhöyük people lived so successfully in an environment dominated by clay it is necessary to go beyond an exclusive concern with clay as a raw material for artefact production. Clay use was not static, but why did it change? Social preferences and the demands of developing technologies would have evolved over time necessitating a corresponding adjustment of clay selection. But equally the clay deposits would have evolved through use or natural processes forcing unplanned changes in raw material procurement. To understand clay raw material use we must also understand how these existed in the dynamic local landscape. Take, for example, the observation that both mudbrick and pottery compositions change throughout Çatalhöyük's occupation, often at the same time (Doherty, 2006, p. 312). The obvious questions are; in what way were changes in mudbrick and pottery related? What were the drivers for

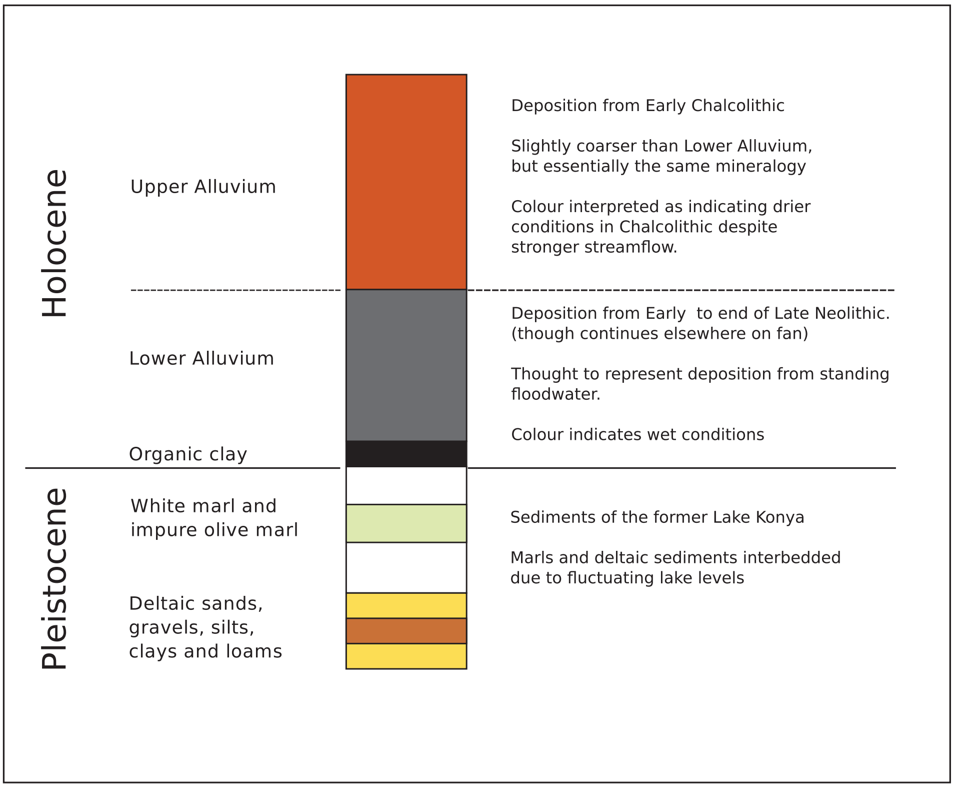

Figure 1.9. The KOPAL stratigraphy. Based on date from Boyer et al., 1999.

change? And what were the constraints? Various scenarios can be easily envisaged involving decreasing raw material availability, technological developments or broader socio-cultural developments. But while such transitions are clear to see they remain difficult to interpret without a full consideration of the environmental context. What is needed is a full understanding of the clay raw materials, the nature of the surrounding landscape, and the potential impacts of clay working. We need to know the range of clays that were available for selection, their spatial and temporal distribution, their suitability, variability, accessibility and the actual areas of extraction.

Clay defined

The novel approach taken by this study is to recognise that clay artefacts can also be read, with due caution, as samples of the landscape and be used in the latter's reconstruction, a vital step in addressing Çatalhöyük's locational paradox. Exploring the relationship between the clay-based material culture and a revised clay landscape will provide new insight into living with clay as the site developed. An essential first task is to define exactly what is meant by 'clay' since this term will be used in its broadest sense. Clay is the finest category of sedimentary particles, having a grain size of less than 0.002 millimetres (ISO, 2002). Figure 1.10a illustrates the relative sizes of sand (2.0-0.063 mm); silt (0.063-0.002 mm); and clay (less than 0.002 mm). Within the clay size category there are in fact two different types of particles (figure 1.10b). The bulk of any clay consists of true clay minerals: plate-like grains whose high surface area gives clay its characteristic sticky and plastic properties. The second group, the non-clay minerals, are simply particles of any rock or mineral that have been reduced to below this critical size threshold.

Details of the characteristics and behaviour of different clay minerals types are not considered here but will be specified later when needed. It sufficient at this point to note that different clay minerals have different properties that influence their behaviour when scale-up to raw materials, soils and landforms. The smallest scale that concerns this study is that of the clay deposit, which can be defined as any concentration of clay that is of sufficient quality and quantity to be considered of use. Actual clay deposits are frequently impure, and the term clay is often used very loosely to describe a range of sediments which, while being fine-grained, often have appreciable contents of coarser materials. For example, a clay soil may contain as little as forty percent clay fraction, i.e. the total material less than 0.002 mm, not just the true clay minerals (figure 1.10c; USDA, 2006). This is true for Çatalhöyük where only a small proportion of the clay-based materials were made from sediments that would

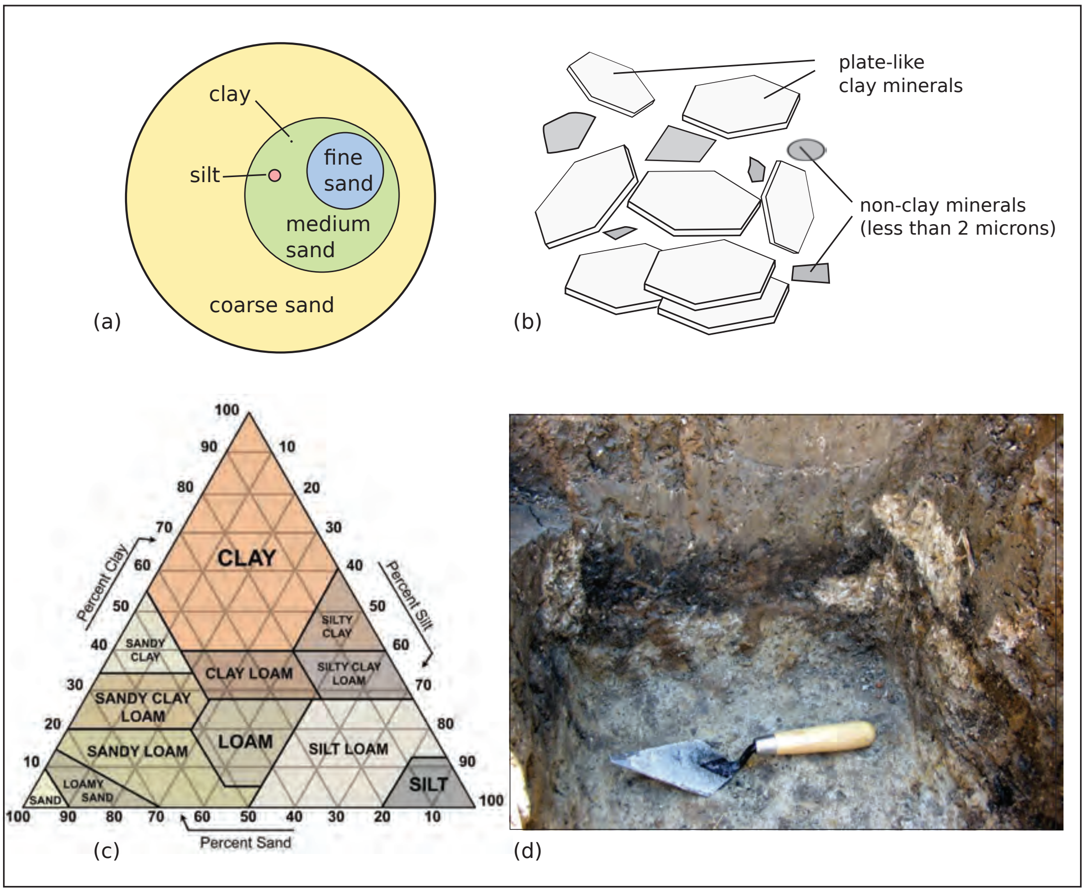

Figure 1.10. Clay: a definition. (a) relative sizes of sand, silt and clay particles; (b) clay is usually a mixture of true clay minerals and non-clays particles of less than 0.002mm diameter; (c) clay and clay-rich soils (USDA, 2006); (d) many Çatalhöyük clays are impure, such as this dark alluvial clay developing above a disturbed marl contact. Photo: Chris Doherty.

be defined in grain size terms as clay *sensu stricto*. Many of the site's clays are derived from subsoil horizons and frequently have a significant quantity of coarser material (figure 1.10d). However, since this broad usage is so well entrenched in the site's literature there seems little to be gained in retrospectively applying a more rigid definition, particularly as there is seldom any confusion as to what is being referred to. In this study the term clay will also be used in a similar broad fashion to describe a mainly fine-grained sediment that is capable of being moulded to give a form with a good cohesive strength (Guggenheim, 1995). Where geological arguments are made, say, to interpret the Holocene depositional environments, or to argue for the drainage characteristics of the landscape, more precise terminology will be followed.

Key themes

A series of key themes will be developed to establish clay's full role at Çatalhöyük. These are:

- How was clay used?
- What were the clay deposits and how did these change?
- What was the nature of Çatalhöyük's clay landscape?
- What was the relationship between material culture and landscape?
- To what extent was Çatalhöyük's success due to its clays?

How was clay used at Çatalhöyük?

The first task is to look at the materials as a whole, rather than as the separate material categories favoured by previous studies. This will establish the relationships between mudbricks, architectural daub, mortars, plasters, clay balls, "miniballs", pottery, figurines, geometric clay objects and stamp seals (pintaderas). Key questions here include: to what extent were different clays used? To what extent were clays processed, for example by the addition of temper? Do the châines opératoire help us to explain what happened as the clay raw materials themselves changed over time?

What were the clay resources and how did these change?

In order to get at the decision-making involved in the production of these clay-based materials we need a clear idea of the full range of contemporary clay deposits, their availability, accessibility, suitability and sequence of use. Only with this level of appreciation is it possible to evaluate to what extent the patterns of clay use reflected technological or socio-cultural influences. A good example is pottery. The early levels of Neolithic Çatalhöyük are thought to be aceramic (Mellaart, 1975, p. 98), although this status may need to be revised. Pottery forms have been recently excavated at the nearby site of Boncuklu, a thousand years earlier (Fletcher, 2017); and although the evidence for intentional firing is slight, these nonetheless record the important transition from clay bins or basket linings to stand-alone vessels. By the time pottery had arrived at Çatalhöyük the firing technology was mature, fabric variation was minimal and there is little evidence of experimentation with form or surface finish in the earliest levels. However, there was a sudden major change at South M (6700-6500 cal BC) when mineral-gritted fabrics were replaced by early chaff-tempered and silty varieties (Hodder, 2016, p.238). It has been shown that this change in pottery fabrics indicates the use of very different clays (Last, 2005; Doherty, 2013). The earliest pottery was made using the surface clays from around the mound, which have a calcareous signal because they are mainly derived from weathering of the marls and limestones of the former lake bed. In contrast, the mineral gritted fabrics are non-calcareous and have mainly volcanic inclusions. Not only does this imply that the raw materials must have been derived some 40-60 kilometres south of Çatalhöyük, it also implies a switch to a clay with quite different performance properties. The question is why did this change take place? Does it signal a developing technological awareness that gritty clays produced better cooking ware? Or, were non-technological influences more important here, such as changing accessibility of clay resources or the influence of other cultural groups? In the latter case, the technical superiority of these new fabrics may have been an unintended bonus rather than the driving force for change.

A similar story can be traced with the marked transition in mudbrick clays. This also occurred at South M, but here we are looking at huge volumes of material that must have been sourced from very close to the mound. Pottery was not abundant at the site (Last, 2005) and each single pot would have required only a few kilograms of clay, but houses were a different proposition. Each mudbrick would have needed several kilograms of clay and estimates suggest that as many as seven hundred and fifty mudbricks would have been required for the average Çatalhöyük house which had a footprint of 4.32 square metres and walls between two and three metres in height (Love, 2010, p.77). As we saw in figure 1.8, early mudbricks were made of dark clay but from South M they changed to red-brown colours, seemingly over a short time interval. What does this transition signify?

From a resource viewpoint, such changes could simply indicate the exhaustion of one clay deposit and a switch to another, or it could signal the availability of an entirely new clay type. But equally, such changes might reflect an increasing sophistication of the related clay technologies (mudbrick manufacture, plastering tradition, pottery making etc.) as these began to exploit more suitable raw materials. Then again, there may have been social rather than physical or technological causes. Perhaps there was increasing competition with other near-site activities, such as horticulture or grazing that required clay to be dug further away from site. Or perhaps the competition was between different household or clan groups; clay sources that were previously available to the whole community may have become restricted to a select few, though as yet there is no accepted evidence for social hierarchy at Çatalhöyük (Hodder, 2006, p.210). Which of these events, if any, were behind the important transitions seen in mudbrick and pottery fabrics?

What was the nature of Çatalhöyük's clay landscape?

To begin to answer these questions, and to reconcile the paradoxical extraction of high volumes of clay for mudbrick construction within a wetland setting, we first need to understand both the clay deposits that would have been available in the Neolithic and the landscape that hosted them. I will therefore discuss how recent research is now questioning the wetland landscape and will further develop this new thinking to suggest a revised landscape model.

What was the relationship between material culture and landscape?

Having looked at the clay-based materials, their technological developments, and raw material sources, I will discuss the relationship between the patterns of clay use and Çatalhöyük's immediate landscape. Changes in raw materials and technology will be compared across the clay material groups and, where possible, correlated with landscape developments to emphasise that this relationship was dynamic and evolved as the growing tell started to alter conditions in the local area.

Was Çatalhöyük's success due to its clays?

A survey of settlements across the Konya Plain immediately before, during and after the Neolithic (Baird, 2002) shows that Çatalhöyük rose to be by far the largest and most influential community. By combining these key theme findings, it is possible to comment on clay's overall contribution to the success of this long-lived community. There are several possible outcomes that can be anticipated. One is that the combination of clays was unique to this location, and this was understood by people who had been living on the Konya Plain for millennia. Here Çatalhöyük rose to prominence by being a central location that could meet the social and cultural demand for specialist clays. Another possibility is that clay was never a special consideration because similar deposits occurred at numerous locations across the Southern Konya Plain. If we also accept the landscape as being problematic for cereal growing, it makes sense to assume that there must have been other attractors. These may have been a combination of wetland resources such as birds, fish, game, or reeds; excavation has shown that all were exploited at Çatalhöyük (Hodder, 2006, p. 88) although there is also evidence that the natural balance was quickly perturbed by the growing tell (Van Neer et al., 2013).

But equally the site may have offered a visual attraction, perhaps centred on open water or contrasting exposures of clay and alluvium. However, such an affordance would also have been highly dynamic as the site and its hinterland evolved. During mid-occupation the visual impact of climbing terraces of brightly whitewashed houses surrounded by a landscape shaped by clay extraction would have differed markedly from that offered at the initial phase of occupation, with its fewer houses and more pristine landscape. Both early and 'peak' visual configurations would be far from that of the modern mound, whose grassy slopes offer little contrast to the backdrop of well-irrigated farmland.

Lastly, the re-examination of the clay landscape may conclude that this was in fact not as hostile to cultivation as has been suggested. If it is shown to have possibly supported larger areas of potential arable land than previously thought then the role of clay in the overall success of the site would have to be reconsidered, as would the idea that this location was selected principally to supply clay for the symbolic needs of the community (Hodder, 2006, p.88). If so it might be concluded that it was the clay soils that allowed Çatalhöyük to flourish. The high clay content would have given these soils sufficient moisture retention to support crop growing through the dry summers, a property that is well-recorded for vertisol soils of the Southern Konya Plain (Virmani, 1982). Such a scenario would explain why this location was initially attractive and why it was able to develop once clay extraction had degraded localised wetland resources and initial visual affordances.

Landscape, taskscape, clayscape

It might be useful to briefly consider the concepts that have guided this work. The research aim was to detail the manner and extent by which clay contributed to the successful development of Catalhoyuk. Because of clay's dual role as the primary raw material for art and artefacts and as a main influence on subsistence via drainage and soil fertility, the approach taken had to be truly multi-scalar. An early consideration was therefore how best to frame these findings to explore clay's influence from its microscopic properties to the broad clay environment that hosted this successful Early Neolithic community.

A particular interest of this study are the moments of transition in clay use, for example as seen in with mudbricks colour or pottery fabrics. In most cases these events saw a physical continuity of the clays in terms of their availability and performance. Discontinuities in clay use or method of use resulted from social actions and decision-making.

Given this intersection between the 'permanent' clay landscape (raw material source, soils) and a temporal pattern of preferred clay use, an obvious candidate for framing the research would be the *taskscape*, i.e. Ingold's term for a socially constricted space defined by related human activities (Ingold, 1993). Since its introduction, taskscape has been popular with archaeologists, and is often customised as specialised variants to promote a particular aspect of the archaeology (for a recent review of taskscape use see Rajala and Mills, 2017). Since a start has already been made towards defining Catalhoyuk's taskscape (Charles et al), there is the option for this current study to develop things further and define a 'clayscape', i.e. a clay-oriented taskscape, for Catalhoyuk.

However, I see two main problems with this approach. First, coming back to the fundamental paradox outlined earlier, many of the tasks performed at Catalhoyuk (mudbrick architecture, daily and seasonal subsistence etc.) are seriously out of sync with an extensive wetland landscape, still the popularly held view of Catalhoyuk's setting. Only when the landscape and the array of known tasks are in step is it meaningful to start modelling the taskscape/clayscape.

Second, this author is not convinced that taskscape is necessarily the best approach to meet the research aims. Taskscape is a web or mesh of human actions but as the following chapters will document, clay's influence often worked via feedback that was not intentional or even fully appreciated by the site's occupants. The implied relative passivity of an invariant or, at best, slowly evolving landscape as counterpart to a more dynamic socially defined taskscape is, in my view, not accurate in the case of Catalhoyuk. A relatively passive role may be suggested from a two-dimensional appreciation of Catalhoyuk's landscape, but look at things in 3D and there was a lot more going on.

For these reasons it was decided to work initially with landscape, revising the model to better fit the archaeological and environmental observations. Thinking in terms of taskscape would have to be delayed at least until Catalhoyuk's clay-related activities (tasks) were no longer conflicted. In the meantime, a working term, 'clayscape' can be initially read simply as 'clay-rich landscape', i.e. as a shorthand to emphasise that clay was the most important landscape component. Its use is simply that of a pointer, in much the same way as 'soilscape' points to the soil surface of a landscape (Deckers et al., 2001): no binding concept is implied. In the final chapter I will return to clayscape to assess whether in fact it has gained value beyond being a simple descriptor, and whether it contains elements that could guide similar studies.